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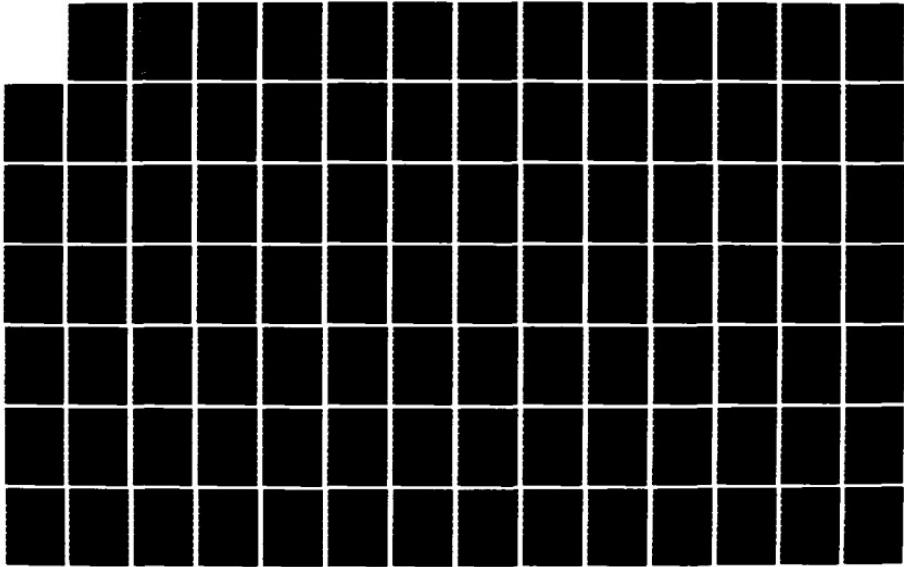
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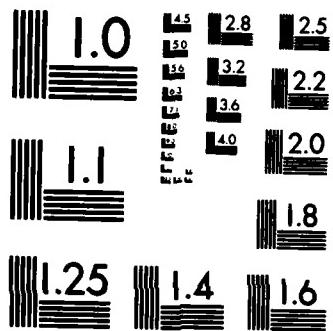
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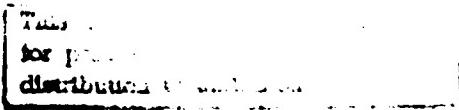
VOL. 1
FIXED-WING AIRCRAFT

by

Glen S. Campbell, R.T.C. Lahey

National Aeronautical Establishment

OTTAWA
APRIL 1983



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**A SURVEY OF SERIOUS AIRCRAFT ACCIDENTS INVOLVING
FATIGUE FRACTURE**
VOL. 1 — FIXED-WING AIRCRAFT

**ÉTUDE SUR DES ACCIDENTS IMPORTANTS D'AVIONS DÙ
AUX EFFETS DES FRACTURES DE FATIGUE**
VOLUME 1 — EFFETS SUR DES AVIONS

by/par

Glen S. Campbell and R.T.C. Lahey

National Aeronautical Establishment

OTTAWA
APRIL 1983

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SUMMARY

A world-wide survey was done of serious aircraft accidents involving fatigue fracture. Volume 1 of the report deals with fixed-wing aircraft, while Volume 2 addresses rotary-wing aircraft. A total of 1466 fixed-wing accidents since 1927 were identified as having fatigue fracture as a related cause, and these accidents resulted in 1861 fatalities. The accidents cover civil and, to a limited extent, military aircraft. Accidents are listed by failure type, as well as by aircraft type. Engine/transmission failure and landing-gear failure were the most common cause of recent fixed-wing accidents, and currently there is an average of about 69 fixed-wing fatigue accidents per year.



RÉSUMÉ

Une étude mondiale a été faite sur des accidents importants d'avions dû aux effets des fractures de fatigue. Le volume 1 traite de ces effets sur des avions, tandis que le volume 2 s'adresse aux hélicoptères. Depuis 1927, 1466 accidents d'avions survenus ont été la cause de fractures de fatigue. De tous ces accidents, 1861 personnes sont décédées. Ces accidents touchent pour la plupart les avions civils tandis qu'un nombre limité touche les avions militaires. Ces accidents sont divisés en deux listes différentes, soit une liste sur les types de fractures et l'autre sur les types d'avions. Les deux types de fractures les plus souvent rencontrés sont les fractures du bloc moteur/transmission et celles touchant le train d'atterrissement. Actuellement, il y a environ 69 accidents dû aux effets de fatigue qui surviennent chaque année.

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1.0 INTRODUCTION

In 1980, NRCC began a comprehensive study of aircraft-related incidents involving metal fatigue. It was quickly realized that this was a monumental task because of the large number of examples available. Many of the fatigue "incidents" were not of a serious nature, such as cracks in the wing skin. These cracks usually were found during routine inspections, were easily repairable, and, considering the size of the crack, did not affect the safety of the aircraft. In order to reduce the extent of that survey to a more manageable size, it was decided to limit the study to aircraft accidents that involved fatalities.

The results of that study were reported in References 1 and 2, and the list of accidents covered civil and, to a limited extent, military accidents worldwide for the period 1934 to early 1980. The listing was not complete, as it was difficult to obtain much information on accidents that happened prior to the early 1960s, except for large civil aircraft, for which complete records go back to about 1945. Nonetheless, the survey was able to document a total of 306 accidents, in which a total of 1803 people were killed. The results also showed that worldwide there was at that time an average of 18 fatal aircraft accidents per year resulting from metal fatigue.

There were many cases where significant accidents were omitted from the survey because no fatalities occurred, either through good fortune, or through excellent piloting skill. An example of the former was the fatigue fracture of the aft cabin pressure bulkhead of an Air Canada DC-9 on September 17, 1979 (Ref. 3). The tailcone along with the aft cabin pressure access door and a portion of the aft cabin pressure bulkhead separated from the aircraft, causing rapid decompression of the passenger and flight-crew compartments. An example of exceptional piloting skill preventing a fatality was the failure of a lower-wing spar on a Zlin during an aerobatic flight in the U.K on 3 June 1970 (Ref. 4). The wing failed, although it remained attached in such a way that it would only support airloads during inverted flight. The pilot, Neil Williams of the British aerobatic team, flew the aircraft inverted until just above the runway, then rolled the aircraft so that it crash-landed on the runway. Although the aircraft was a complete write-off, Mr. Williams was unhurt. Accidents such as these should be included in any comprehensive survey of fatigue fracture in aircraft.

Another shortcoming of the initial survey was that only three landing-gear failures to fixed-wing aircraft were included, whereas anyone reading through accident reports will note that a large number of fatigue failures involve the landing gear. These accidents, however, are seldom fatal.

In order to cover cases like this, the survey has been expanded to include accidents involving either

- a fatality,
- substantial damage to the airframe, or
- aircraft destroyed.

Accidents are included in the survey if fatigue fracture was somehow involved, although not necessarily as the primary cause of the accident. For example, the survey includes the 25 May 1979 crash at Chicago of a

DC-10, following separation of an engine from the wing. In that case, the probable cause was determined to be maintenance-induced damage to the engine pylon during installation of the engine (Ref. 5). This accident is included in the survey (Appendix H, item H33), because the pylon crack, though caused by a maintenance error, propagated by fatigue during the 24 days between the engine change and the crash.

Another example is the Boeing 707 tail-fin failure at Mount Fuji, Japan, on 5 March 1966 (Ref. 6). The probable cause was attributed to the sudden encounter of abnormally severe turbulence, which imposed a gust load considerably in excess of the design limit. The accident is included (item B14, Appendix B), because fatigue cracks were found in the vertical-stabilizer rear-spar attachment fitting, and tests on a similar fitting with cracks of that size failed at 110% of the limit design fin gust load, well below the design ultimate load.

The results of the survey are given in two parts:

- Volume 1 - fixed-wing aircraft (this report),
- Volume 2 - rotary-wing aircraft (Ref. 7).

The complete survey covers both fixed-wing aircraft and helicopters, and lists 1885 accidents since 1927, involving 2240 fatalities.

This volume (fixed-wing aircraft) lists 1466 accidents, which have resulted in 1861 fatalities. The accidents are listed two ways, first by type of failure, such as wing or tail failure, and secondly by aircraft type.

It should be noted that this survey cannot be claimed to be comprehensive, and is restricted to the sources listed in Section 3. The survey does, however, indicate the magnitude of the fatigue problem.

There are other considerable costs, besides fatalities, that are attributable to metal fatigue, and are not covered by this survey. These costs include:

- cost of inspections required to detect cracks in known areas prone to fatigue cracking;
- cost of replacing components known to be fatigue-critical, and which have a safe life much shorter than the airframe as a whole (such as main and tail rotor blades);
- cost of down-time when a fleet is grounded because of the unexpected discovery of a fatigue crack in a critical region.
- cost of repairs or strengthening of an area found to be fatigue-prone.
- loss of operational capability (including the reduced ability to defend one's country) when a fighter or bomber fleet is grounded for inspections and possibly repairs, following the unforeseen discovery of a fatigue crack in a critical area.

How to Use This Report

Fixed-wing accidents are covered in Volume 1 (this volume), while for rotary-wing accidents, refer to Volume 2 (Ref. 7).

In this report, the information is presented a number of different ways:

(1) For a listing of accidents by major component or system, see the following Appendices:

- wing	Appendix A
- tail	Appendix B
- fuselage	Appendix C
- flight controls	Appendix D
- engine or transmission	Appendix E
- propeller	Appendix F
- landing gear	Appendix G
- miscellaneous	Appendix H

(2) For a listing of fatigue failures experienced by a particular aircraft type, see Appendix I ("LIST OF FIXED-WING ACCIDENTS - ORDERED BY AIRCRAFT TYPE"). A summary of repeated fatigue failures is found in Table 2 ("LIST OF REPEATED FATIGUE FAILURES - FIXED-WING").

(3) To find out what accidents occurred in a particular country, or belonging to a particular military service, see the cross-reference listing in Table 5 ("LIST OF ACCIDENTS BY COUNTRY - FIXED-WING") and use the identification number to find the corresponding accident in Appendices A through H.

(4) To find out accidents occurring from a particular form of crack initiation (for example "fretting"), look up the cross-reference list in Table 4, and use the identification number to find the accident in Appendices A through H.

2.0 DEFINITIONS AND ABBREVIATIONS

Whether to call a structural failure an "incident" or an "accident" can sometimes be a problem. For example, if a main spar fails on an aircraft having a multi-spar wing, and the damage is detected during the post-flight inspection, the case would be considered an "accident". But suppose in the same instance, the damage was not discovered until several months later, as in the case of the Vickers Viking in 1951 (item A32 in Appendix A)? In that case, a "bang" was heard during the flight, but no damage could be found in the post-flight inspection. It was not until three months later that the centre-section spar boom was found to be completely severed (Ref. 8).

The approach used in this report is to adopt the definitions used by the International Civil Aviation Organization (Ref. 9):

"Aircraft Accident: An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all persons

have disembarked, in which:

- (a) any person suffers death or serious injury as a result of being in or upon the aircraft by direct contact with the aircraft or anything attached thereto, or
- (b) the aircraft receives substantial damage.

Substantial Damage: Damage or structural failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft and which would normally require the major repair or replacement of the affected component. The following types of damage are specifically excluded: engine failure, damage limited to an engine, bent fairings or cowling, dented skin, small punctured holes in the skin or fabric, taxiing damage to propeller blades, damage to tires, engine accessories, brakes, or wing tips."

In the example of the Vickers Viking given above, the item was included in the survey as an accident, by virtue of the above definition of substantial damage. An example of an incident would be the loss of one of the small trailing-edge foreflaps of a jumbo jet.

List of Abbreviations Used

The following abbreviations have been used in this report:

AA	Administration de l'Aeronautique (Belgium).
AD	Airworthiness Directive.
AF	Air Force.
AFFDL	US Air Force Flight Dynamics Laboratory.
ARC	UK Aeronautical Research Council.
ARL	Australian Aeronautical Research Laboratories.
ASTM	American Society for Testing and Materials.
AWST	"AVIATION WEEK & SPACE TECHNOLOGY" magazine.
AW	"AVIATION WEEK" magazine.
BoA	Board of Aviation.
BoT	Board of Trade.
CAA	UK Civil Aviation Authority.
CAB	US Civil Aeronautics Board.
CF ACAIRS	Canadian Forces Aircraft Accident Reporting System (a computer storage/retrieval system for accident data).
D	Destroyed.
Dam	Damage to the airframe.
DoT	Department of Transport.
FI	"FLIGHT INTERNATIONAL" magazine.
ICAF	International Committee on Aeronautical Fatigue.
ICAO	International Civil Aviation Organization.
ICAO AAD	ICAO "AIRCRAFT ACCIDENT DIGEST".
ICAO ADREP	ICAO Accident Data Report (a computer storage/retrieval system for accident data).
MLG	Main landing gear.
MoT	Ministry of Transport (Canada).
NBS	US National Bureau of Standards.
NTSB	National Transportation Safety Board (USA).
NTSB AAR	NTSB Aircraft Accident Report.
NZ AAR	New Zealand Aircraft Accident Report.
NZ AIB	New Zealand Accident Investigation Bureau.

RAN	Royal Australian Navy
RAAF	Royal Australian Air Force
RAF	Royal Air Force, UK
S	Substantial damage to the airframe.
UK	United Kingdom.
USAF	United States Air Force.
WAAS	"WORLD AIRLINE ACCIDENT SUMMARY" (Ref. 10).
WADC	Wright Air Development Centre

3.0 SOURCES OF INFORMATION

The following sources were used for information on fatigue-related accidents:

World-Wide Civil Accidents

1. "WORLD AIRLINE ACCIDENT SUMMARY" (Ref. 10). This reference, which is updated several times per year, lists all civil aircraft accidents that have occurred since 1946. Only fixed-wing aircraft over 5700 kg (12,500 lb) maximum gross weight are covered.

2. International Civil Aviation Organization (ICAO). ICAO has a computer data-base of all civil aircraft accidents for 1970 and onwards. The data-base covers all civil aircraft, both fixed-wing and helicopter, whose gross weight is over 2250 kg (4960 lb).

3. Magazines, such as "AVIATION WEEK & SPACE TECHNOLOGY", "FLIGHT INTERNATIONAL", and "INTERNATIONAL HELICOPTER".

4. Mann's bibliographies on the fatigue of materials (Refs. 11 and 12), and Anderson's review paper on the fatigue of aircraft structures (Ref. 13) provided references to much of the data available in the published literature. Anderson's paper, in addition, lists some service fatigue experiences for the period from early in World War II until 1970.

Also, all the member countries of ICAO were queried for civil accident information, and National Delegates from the International Committee on Aeronautical Fatigue were asked to obtain whatever information was openly available from the military authorities in their country. The following countries provided information for the periods indicated:

CIVIL	MILITARY
Argentina	Royal Australian Air Force (1953 - 1981)
Australia (1969 - mid-1981)	Royal Australian Navy (1959 - 1981)
Barbados	Belgian Air Force (to mid-1981)
Belgium (1950 - mid-1981)	Canadian Forces (1950 - early 1981)
Brazil	Swedish Air Force (1967 - Aug. 1981)
Burma	UK - Royal Air Force
Canada (1916 - mid-1982)	US Army (1972 - Mar. 1981)
Cape Verde	
Cyprus	
Egypt	
Finland (1962 - Jan. 1982)	
Federal Republic of Germany (1975 - Aug. 1981)	

Greece
Guyana
Hong Kong
Iceland
Iraq
Ireland
Jamaica (1966 - 1981)
Japan (1973 - Feb. 81)
Kenya
Lethoso
Malaysia
Malawi
Malta
Mexico
Netherlands
New Zealand
Norway
Pakistan
Papua New Guinea
Portugal
Rwanda
Seychelles
South Africa (to April 1981)
Sweden
Switzerland
Thailand
USA (1964 - late 1981)

Data on accidents prior to the introduction of the ICAO reporting system in the late 1940s are very difficult to obtain. Details of accidents to aircraft below 2250 kg (4960 lb) gross weight (the lower limit for which accidents are reported to ICAO) are scarce prior to the mid 1960s, when countries began transferring to computer storage and retrieval of accident data.

Even for cases where accident data are available, particularly prior to the 1950s, often the accident cause does not specifically mention fatigue. The cause will be listed as "failure of component", rather than "fatigue-failure of component". This is particularly true for failures involving engine components, and it is quite possible that the number of engine-related accidents has been understated in this survey.

There are almost no accident data available from communist countries, as they do not divulge accident data, not even to ICAO.

Because of security reasons, only six countries were able to provide data on accidents to military aircraft. The few examples from other countries included in this report were obtained from news reports and trade publications.

4.0 RESULTS

The results of the survey are summarized in Table 1. A total of 1466 fixed-wing accidents were found, resulting in 1861 fatalities. Including the rotary-wing accidents from Volume 2 of this survey (Ref. 7)

gives a combined fixed-wing and rotary-wing total of 1885 accidents and 2240 fatalities. A total of 393 fixed-wing and 165 rotary-wing aircraft were destroyed.

For fixed-wing aircraft, failure of the landing gear was the most common fatigue problem, and accounted for 37% of the accidents. A landing-gear failure is, however, seldom a fatal accident, as only 5 of the 542 landing-gear accidents (1%) resulted in a fatality.

Following close behind were engine/transmission failures (28% of the fixed-wing accidents), and propeller failures (16%).

4.1 Listing of Accidents

Where possible, the following information is given in the listings for each accident:

- Aircraft type
- Aircraft operator (private aircraft excepted)
- Accident date
- Damage to airframe ("D" = destroyed, "S" = substantial)
- Number of fatalities
- Geographical location of the accident
- A brief description of the location of the fatigue failure
- A reference to the accident report number, or where information on the accident was obtained. (To conserve space, references are only given in the listing by accident type).

Each accident has been assigned an identification number for cross-referencing purposes. The identification number consists of a letter, corresponding to the Appendix in which the accident is listed, and a number, referring to the number of the accident within the Appendix. For example, the identification number A39 refers to the 39th accident listed in Appendix A (fixed-wing aircraft, wing failure).

4.1.1 Listing of Accidents by Failure Type

The listing of fixed-wing accidents according to failure type is found in Appendices A through H.

Three of the wing failures in the United States are included, although it was not possible to verify them officially, because they occurred prior to the introduction of the National Transportation Board's computer-based data bank. These accidents are for the Cessna 140 (1956, item A48 in Appendix A), and the Cessna 195 (1960, item A57, and 1963, item A66). Similarly, no detailed information is available on the wing failures of the Wellington Bomber (items A4 to A23) during World War II.

The earliest reported accident was the 1927 wing-failure in Germany of a Dornier Merkur, a single-engined, six-passenger airliner belonging to Luft Hansa (item A1). The wing strut failed close to the upper attachment point (Refs. 14, 15, & 16).

As a point of interest, failures of the left and right wings

occurred about equally, with 32 of the failures being of the port wing, and 34 of the starboard wing.

It should be noted that the number of wing accidents (137) is somewhat biased by the 20 wing failures of the Wellington bomber in the 1942 to 1944 period (items A4 to A23).

4.1.2 Listing of Accidents by Aircraft Type

The listing of accidents by aircraft type is given in Appendix I. Even the venerable DC-3 has not been immune to fatigue problems, and three DC-3 wing failures are included. That number is, however, only a very small percentage of the approximately 10,000 DC-3/C-47 aircraft that were manufactured.

Ten accidents occurred for which the aircraft type was not specified. These are listed at the end of Appendix I under the headings "Type Unknown". The authors welcome any further information on these accidents.

4.2 List of Repeated Failures

Table 2 lists fixed-wing aircraft that have had more than one serious accident resulting from metal fatigue of the same general area. (There is a similar list for rotary-wing aircraft in Reference 7.) Unfortunately, there was generally insufficient information available to determine if these failures were in precisely the same part and location.

The ordering of the list is by number of accidents. For additional information on individual accidents, refer to the corresponding identification numbers in Appendices A through H.

In searching for repeated fatigue failures, it is advised also to check the aircraft type under Appendix I ("Listing of Accidents by Aircraft Type"), as some accidents have insufficient information to pinpoint the exact failure location, so additional failures may appear in that Appendix that do not show up in Table 2.

Some examples of repeated failures are:

Aircraft	No. of Accidents	Failure Area
Cessna 182	21	Nose gear fork
Vickers-Armstrongs Wellington	20	Wing spar boom
Mooney M-20	15	Propeller blade
Piper PA-28 Cherokee	14	Propeller blade
Boeing Stearman	12	Propeller blade
Grumman AgCat	11	Main landing gear
Cessna 180	10	Main landing gear leg (at axle attachment bolt holes)

It is beyond the scope of this report to examine each of the cases of repeated failure in order to determine which are still on-going and

have not had sufficient action taken in order to arrest the problem. An examination of the Airworthiness Directives for the aircraft in question would be required, as well as a detailed review of the accident reports to determine if the accident was not simply a result of inadequate maintenance by the operator. Examples of recent fatigue failures that have occurred at least four times in the past include:

AIRCRAFT	FAILURE AREA	NO. OF ACCIDENTS	DATES
Aero Commander S-2R	Engine cylinder	4	1974-81
Beech Bonanza	Propeller blade	4	1967-80
Beech Baron/Cochise	Propeller hub	5	1974-81
Cessna 140	Main landing gear (bolt hole at step attach point)	4	1964-81
Cessna 150	Propeller blade	6	1967-80
Cessna 150	Engine cylinder	5	1968-81
Cessna 150	Nose gear fork	4	1964-80
Cessna 170	Main landing gear axle	7	1966-81
Cessna 172	Propeller blade	6	1970-81
Cessna 180	Main landing gear leg (at axle attachment bolt holes)	10	1959-81
Cessna 180	Main landing gear leg (at fuselage)	8	1959-80
Cessna 185	Propeller blade	5	1964-80
Cessna 185	Outer main landing gear support bracket	5	1976-81
Douglas B-26 Invader	Wing spar	4	1964-80
Grumman AgCat	Engine cylinder	4	1968-80
Mooney M-20	Propeller blades	15	1965-80
Piper PA-25 Pawnee	Wing	5	1967-80

Some of these problems have been on-going for a number of years, as for example the two problem areas in the Cessna 180 main landing gear leg.

4.3 Breakdown of Accidents by Year

Table 3 gives a yearly breakdown of the type of fatigue failures that have occurred in fixed-wing aircraft.

The total number of reported fixed-wing plus rotary-wing accidents occurring in each year is plotted in Figure 1. The big increase in the mid-1960s is the result of improved availability of accident information with the introduction of computer-based information systems in a number of countries (particularly the introduction of the US National Transportation Safety Board system in 1964). Over the last five years there has been an average of 100 fatal accidents (fixed-wing plus rotary-wing) per year resulting from metal fatigue.

The number of fixed-wing accidents for each year is plotted in Figure 2. An average of 69 serious fatigue accidents per year have occurred over the past five years. The numbers of rotary-wing accidents are shown in Figure 3.

Figure 4 shows the breakdown of fixed-wing accidents by failure type. Failures in the wing primary structure have occurred fairly consistently since the early 1950s, and are still a problem, as the latest five-year average is about three per year. Since 1976, engine/transmission fatigue failures have been the most common accident cause, with 26 accidents per year on average. Prior to that time, landing gear failures were the most common accident, with a peak of 58 accidents reported in 1965, but landing-gear failures have dropped to about 20 per year recently. As pointed out by Buxbaum (Ref. 17), the loads seen by a landing gear are very complex, and it is apparent, from the number of accidents, that landing gears have been under-designed in the past.

Propeller failures have a five-year average of 11 accidents per year. Most of the current propeller problems are for light aircraft, and many of these fatigue failures initiate from dents, nicks, or pits, which should be detectable by the pilot during his pre-flight inspection. Propeller failures were a common problem in the 1930s, but no specific details are available. Reference 18 reports the following numbers of propeller failures for US aircraft. It is not known how many of these were attributable to fatigue, although the report indicates that vibratory stresses were the main cause.

<u>Year</u>	<u>No. of propeller failures</u>
1931	37
1932	41
1933	34
1934	13
1935	8
1936	11
1937	15
1938	23
1939	6
1940	0

The introduction of vibration dampeners after 1938 considerably reduced the number of propeller problems, as the above table shows.

4.4 Initiation Sites

The fatigue-crack initiation sites for the fixed-wing accidents are listed in Table 4. The identification numbers that are given can be used to look up the corresponding accident in Appendices A through H. Some failures are listed under more than one cause. For example, accident A122 in Appendix A was initiated by a corrosion pit in the bore of a bolt hole, so the accident is listed in Table 4 under "Fastener Hole", as well as "Corrosion". The initiation sites are summarized as follows:

<u>INITIATION SITE</u>	<u>NO. OF ACCIDENTS</u>
Bolt, Stud or screw	108
Fastener hole or other hole	72
Fillet, radius, or sharp notch	57
Weld	53
Corrosion	43
Thread (other than bolt or stud)	32
Manufacturing defect	27
Scratch, nick, or dent	26
Fretting	13
Surface or subsurface flaw	6
Improper heat treatment	4
Maintenance-induced crack	4
Work-hardened area	2
Wear	2

The above total does not equal the number of accidents in the survey, since information about the initiation site is unavailable in many cases.

4.5 Listing of Accidents by Country

Table 5 gives a cross-reference list of accidents by the country of occurrence. The identification numbers that are given can be used to look up the accident in Appendices A through H. The cross-reference list is in two parts - civil aircraft, and military aircraft. For military aircraft, the accidents are listed by owner (i.e., Canadian Forces), rather than by country of occurrence.

5.0 CONCLUSIONS

1. Although this survey does not claim to be comprehensive, a total of 1885 fixed-wing and rotary-wing aircraft accidents involving fatigue fracture since 1927 are covered by this survey. These accidents claimed 2240 fatalities worldwide. Furthermore, serious fatigue-related accidents are still occurring at a rate of about 100 per year.

2. Fixed-wing aircraft accounted for 1466 accidents and 1861 fatalities. Recently, there has been an average of about 61 fixed-wing fatigue accidents per year.

3. For fixed-wing aircraft, failure of the landing gear has been the most common fatigue problem over the years, accounting for 37% of the accidents. However, a landing-gear failure is only fatal about 1% of the time.

4. The common causes of fixed-wing fatigue failures over the past few years have been engine failure/transmission failure (averaging 26 per year), landing gear (20 per year), propeller failure (11 per year), and the wing primary structure (three per year).

5. Many of the propeller problems occur for light aircraft, and initiate from nicks or dents on the blade. This type of damage should be noticed by the pilot during his pre-flight inspection.

6. There are many cases of repeated accidents from the same cause. Seventeen examples are given of fixed-wing aircraft that have had at least four fatigue failures, one of which was recent. A more thorough review of the accident reports and Airworthiness Directives would be required in order to determine which of these problems are still on-going and have not had sufficient action taken in order to arrest the problem.

7. The five most common initiation sites for fatigue cracks that have resulted in fixed-wing accidents are:

- (1) bolt, stud, or screw,
- (2) fastener hole or other hole,
- (3) fillet, radius, or sharp notch,
- (4) weld, and
- (5) corrosion.

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TABLE 1
SUMMARY OF SERIOUS ACCIDENTS - FIXED-WING

<u>CATEGORY</u>	<u>NO. ACCIDENTS</u>	<u>NO. AIRCRAFT DESTROYED</u>	<u>NO. FATALITIES</u>
<u>FIXED-WING AIRCRAFT</u>			
Landing Gear	542	9	21
Engine or Transmission	408	144	536
Propeller Failure	232	52	162
Wing	137	119	400
Flight Controls	48	28	68
Tail	37	21	244
Miscellaneous	37	11	285
Fuselage	25	9	145
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FIXED-WING TOTALS	1466	393	1861
ROTARY-WING TOTALS	419	165	379
-----	-----	-----	-----
OVERALL TOTALS (FIXED-WING + ROTARY-WING)	1885	558	2240

TABLE 2

LIST OF REPEATED FATIGUE FAILURES - FIXED-WING

(Note: failure may not be in exactly same part)

AIRCRAFT TYPE	NO. OF ACCIDENTS	FAILURE AREA	ACCIDENT DATES	IDENTIFICATION NUMBER OF ACCIDENTS
Cessna 182	21	Nose gear fork	1964-75	G46 G59 G72 G82 G93 G109 G113 G115 G120 G124 G144 G151 G177 G186 G192 G197 G198 G208 G225 G239 G388
Vickers-Armstrongs Wellington	20	Wing spar boom	1942-44	A4-A23
Mooney M-20	15	Propeller blade	1965-80	F26 F34 F47 F52 F62 F69 F72 F83 F90 F91 F128 F133 F138 F200 F223
Piper PA-28 Cherokee	14	Propeller blade	1964-79	F21 F33 F38 F39 F80 F93 F99 F119 F152 F180 F190 F197 F206 F213
Boeing Stearman	12	Propeller blade	1965-76	F31 F42 F44 F50 F59 F77 F78 F82 F104 F140 F150 F176
Grumman AgCat	11	Main landing gear	1964-76	G67 G170 G188 G232 G302 G311 G312 G347 G383 G414 G427
Cessna 180	10	MLG leg (at axle attachment bolt holes)	1959-81	G13 G17 G110 G167 G181 G207 G270 G276 G465 G537
Beech 35/36 Bonanza	9	Crankshaft	1971-79	E158 E183 E222 E256 E289 E321 E343 E344 E345
Beech 18	8	Wing	1947-73	A27 A75 A78 A79 A82 A102 A107 A110
Cessna 172	8	Nose gear fork	1964-70	G61 G100 G106 G107 G147 G175 G220 G278
Cessna 180	8	MLG leg (at fuselage)	1959-80	G15 G26 G33 G47 G146 G462 G484 G497
Cessna 170	7	MLG axle	1966-81	G193 G216 G305 G399 G451 G513 G533
Cessna 180	7	MLG leg (location unspecified)	1959-77	G12 G327 G365 G389 G395 G428 G441

TABLE 2 (Cont'd)
LIST OF REPEATED FATIGUE FAILURES - FIXED-WING

AIRCRAFT TYPE	NO. OF ACCIDENTS	FAILURE AREA	ACCIDENT DATES	IDENTIFICATION NUMBER OF ACCIDENTS
Cessna 150	6	Propeller blade	1967-80	F55 F75 F135 F212 F216 F218
Cessna 172	6	Propeller blade	1970-81	F89 F94 F115 F121 F203 F228
Cessna 180	6	Propeller blade	1961-75	F11 F24 F40 F87 F88 F144
Cessna A188	6	MLG leg	1969-79	G245 G264 G296 G362 G461 G481
Cessna 210	6	Crankshaft	1976-79	E254 E262 E282 E299 E303 E347
Champion Citabria	6	MLG attach bolt	1970-76	G279 G290 G307 G321 G338 G436
<hr/>				
Beech 18	5	Propeller blade	1964-77	F20 F23 F45 F141 F188
Beech Baron/Cochise	5	Propeller hub	1974-81	F131 F181 F182 F221 F232
Cessna 150	5	Engine cylinder	1968-81	E101 E329 E335 E380 E401
Cessna 185	5	Propeller blade	1964-80	F16 F53 F106 F149 F219
Cessna 185	5	Outboard MLG support bracket	1976-81	G416 G496 G499 G500 G525
Cessna 210	5	Propeller blade	1964-78	F15 F74 F130 F136 F195
Cessna 210	5	MLG actuator spindle shaft	1966-78	G160 G195 G298 G340 G455
Piper PA-25 Pawnee	5	Wing	1967-80	A83 A108 A109 A111 A131
Saab-Scania Draken	5	Compressor blade	1967-75	E93 E127 E136 E185 E232
<hr/>				
Aero Commander S-2R	4	Engine cylinder	1974-81	E216 E393 E396 E400
American AA-1	4	Propeller blade	1971-76	F95 F117 F147 F169
Beech 35 Bonanza	4	Propeller pitch-change bolts	1967-75	F64 F85 F110 F151
Beech Bonanza	4	Propeller blade	1967-80	F60 F134 F191 F222
Beech Musketeer/Sundowner	4	Propeller blade	1966-77	F37 F56 F161 F184
Boeing Stearman	4	Crankshaft (thrust nut area)	1964-69	E39 E44 E85 E117
Cessna 140	4	MLG (bolt hole at step attach point)	1964-81	G45 G215 G261 G539
Cessna 150	4	Nose gear fork	1964-80	G58 G117 G234 G515
Cessna 172	4	Engine cylinder	1966-79	E83 E179 E304 E330
Cessna 180	4	MLG attach bolt	1964-79	G71 G187 G285 G480
Cessna 182	4	Propeller blade	1974-77	F142 F171 F177 F187
Cessna 195	4	MLG leg	1967-75	G222 G252 G262 G412
Cessna 210	4	MLG saddle assembly	1969-78	G244 G417 G425 G457
Cessna 310	4	Propeller hub	1968-76	F76 F124 F163 F174
Curtiss C-46	4	Hold-down studs of engine cylinder	1956-65	E6 E23 E24 E59

TABLE 2 (Cont'd)
LIST OF REPEATED FATIGUE FAILURES - FIXED-WING

AIRCRAFT TYPE	NO. OF ACCIDENTS	FAILURE AREA	ACCIDENT DATES	IDENTIFICATION NUMBER OF ACCIDENTS
Douglas B-26 Invader	4	Wing spar	1964-80	A70 A71 A74 A134
Douglas DC-6	4	Propeller blade	1950-76	F5 F10 F17 F165
General Dynamics F-111A	4	Tailplane actuator assembly	1968	D15 D16 D17 D18
Grumman AgCat	4	Engine cylinder	1968-80	E107 E190 E302 E356
Transavia Airtruk	4	Nose landing gear	1970-74	G265 G318 G339 G364
Aero Commander 560/680	3	Wing spar cap	1961-67	A62 A73 A81
Aero Commander 500	3	Propeller hub	1971-73	F98 F102 F122
Beech 35 Bonanza	3	Wing centre-section truss	1961-63	A61 A63 A68
Boeing B-47	3	Wing (longeron)	1958	A53 A54 A55
Boeing B-52	3	Wing	1953?-61?	A39 A40 A60
Boeing B-52	3	Fuselage	1961-63	C10 C11 C12
Boeing 727	3	Main landing gear trunnion support beam	1970-71	G282 G291 G304
Bristol 170	3	Wing	1953-57	A43 A47 A51
CallAir/Aero Commander A-9	3	Crankshaft	1969-73	E114 E157 E188
Cessna 140	3	MLG axle	1965-76	G99 G263 G423
Cessna 177	3	Propeller blade	1975-78	F154 F155 F202
Cessna 182	3	Nosewheel shimmy dampener support bracket	1964-67	G53 G191 G226
Cessna 185	3	Mixture-control valve shaft in air intake box	1977-80	D297 E306 E360
Cessna A188	3	Propeller hub	1973-81	F118 F145 F230
Cessna A188	3	MLG bolt	1971-74	G297 G341 G375
Cessna 206	3	Crankshaft	1973-81	E189 E226 E378
Cessna 206	3	Propeller hub	1968-81	F68 F125 F229
Cessna 206	3	Propeller blade	1968-81	F67 F112 F227
Cessna 402	3	Exhaust manifold system	1975-78	E233 E295 E318
Champion Citabria	3	MLG axle	1970-81	G287 G469 G522
Champion Citabria	3	MLG leg strut attachment	1975-82	G398 G446 G540
de Havilland Dove	3	Wing	1951-71	A33 A92 A98
DHC-2 Beaver	3	Wing strut attachment fitting	1963-81	A69 A76 A136
Douglas DC-3	3	Wing	1968-73	A85 A104 A106
Douglas DC-3	3	Engine cylinder	1946-64	E2 E3 E38
Douglas DC-3	3	MLG brace strut fitting	1959-64	G10 G24 G74
Douglas DC-6	3	NLG upper torque link	1965-80	G121 G283 G505
Fokker F-27	3	Engine, low-pressure impeller	1972-79	E177 E203 E331
Lockheed Constellation	3	Propeller blade	1947-53	F3 F4 F8
McDonnell Douglas F-4	3	Wing skin	1969-70	A90 A93 A94

TABLE 2 (Cont'd)
LIST OF REPEATED FATIGUE FAILURES - FIXED-WING

AIRCRAFT TYPE	NO. OF ACCIDENTS	FAILURE AREA	ACCIDENT DATES	IDENTIFICATION NUMBER OF ACCIDENTS
McDonnell Douglas F-4	3	Stabilator	pre-1972	B19 B20 B21
Mooney M-20	3	Propeller hub	1967-76	F48 F51 F162
N. American F-86 Sabre/FJ-4 Fury	3	Wing	1954-59?	A44 A45 A46
Piper PA-22	3	Nose gear mount/ support tubes	1965-78	G111 G156 G467
Piper PA-25 Pawnee	3	MLG shock strut	1964-74	G57 G84 G377
Piper PA-28 Cherokee	3	Exhaust valve	1976-81	E267 E388 E392
Piper PA-28 Cherokee	3	MLG torque link	1972-81	G323 G325 G527
Piper PA-32 Cherokee SIX	3	Engine cylinder	1974-81	E221 E308 E402
Saab-Scania Draken	3	Turbine disc	1977-79	E298 E310 E341
Saab-Scania Viggen	3	Wing spar	1974-75	A113 A115 A116
Snow S-2	3	Connecting rod	1971-75	E159 E176 E241
Snow S-2	3	Propeller blade	1966-71	F43 F65 F100
Stinson 108	3	Engine cylinder	1964-79	E31 E187 E332
LTV A-7 Corsair II	3	Engine spacer collar	1972	E161 E162 E163
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Aero Commander 100	2	Propeller	1973-75	F123 F146
Aero Commander 112	2	Propeller	1975-76	F159 F178
Aero Commander 500	2	Propeller blade	1976-78	F172 F192
Aero Commander 520	2	Nosewheel fork	1964-66	G73 G194
Aero Commander 690	2	Torque link shaft	1979-80	G475 G511
Aero Commander S-2R	2	Propeller blade	1978-79	F194 F211
Aerospatiale Caravelle	2	Nose wheel axle	1964-66	G50 G185
Avro CF-100 Canuck	2	Flap hinge bracket	1954-56	D2 D3
Beech 58 Baron	2	Crankshaft	1976-79	E266 E326
Beech 58 Baron	2	Landing gear retract ball end	1975-78	G393 G453
Beech 35 Bonanza	2	Conrod bolt	1974	E212 E224
Beech 35 Bonanza	2	Cylinder hold- down studs	1971-77	E153 E285
Beech 35 Bonanza	2	Nose gear actuator retract arm	1964-67	G62 G223
Beech Queen Air	2	Crankshaft	1976-77	E265 E287
Boeing 377 Stratocruiser	2	Propeller	1952-55	F6 F9
Boeing 707/720	2	Fan disc	1965-71	E50 E149
Boeing 707	2	Nose gear outer cylinder	1973-75	G350 G394
Boeing 707	2	Landing gear axle	1964-65	G90 G112
CallAir/Aero Commander A-9B	2	Conrod	1971-74	E146 E206
Cessna 150	2	Rudder	1962-68	B11 B16
Cessna 150	2	Left gear spring assembly	1964-65	G92 G134
Cessna 172	2	Aileron push- pull rod	1965-71	D11 D21
Cessna 172	2	Engine mixture control wire	1971-81	E151 E403
Cessna 175	2	Nose wheel fork	1964-68	G80 G227

TABLE 2 (Cont'd)
LIST OF REPEATED FATIGUE FAILURES - FIXED-WING

AIRCRAFT TYPE	NO. OF ACCIDENTS	FAILURE AREA	ACCIDENT DATES	IDENTIFICATION	
				NUMBER OF ACCIDENTS	
Cessna 182	2	Master & connecting rods	1964	E33	E37
Cessna 185	2	Crankshaft	1966-76	E77	E259
Cessna 185	2	MLG leg (at axle attachment)	1971-77	G306	G452
Cessna 195	2	Wing carry-through	1960-63	A57	A66
Cessna 206	2	Cylinder head	1969-79	E111	E324
Cessna 210	2	Connecting rod	1965-75	E57	E240
Cessna 210	2	Cylinder hold-down studs	1976-80	E273	E361
Cessna 310	2	Propeller blade	1967-72	F58	F114
Cessna 336	2	Propeller blade	1968-76	F70	F168
Convair 580	2	Nose gear drag strut	1973-79	G352	G477
Convair 600	2	Nose gear piston rod	1969-72	G257	G324
de Havilland Comet I	2	Fuselage at ADF window	1954	C6	C7
DHC-2 Beaver	2	Engine cylinder	1979-80	E338	E363
DHC-3 Otter	2	MLG attachment bolt	1967-77	G217	G445
Grumman AgCat	2	Crankshaft	1973-80	E192	E362
Grumman Mallard	2	Hydraulic line	1964	H4	H5
Handley Page Hastings	2	Elevator outer-hinge bolt	1953-65	B8	B13
Handley Page Hermes	2	Crankshaft web	1952	E8	E9
Helio H-295	2	Wing attach fitting	1971-78	A100	A122
Lockheed Constellation	2	MLG strut cylinder	1960	G19	G20
Lockheed Constellation	2	Nose gear actuating strut	1964	G49	G76
Lockheed C-5A	2	Engine compressor rear frame	1982	E406	E407
Lockheed F-104	2	Wing	pre-1969-71	A89	A97
Luscombe 8A	2	Landing gear bolt	1966-68	G179	G236
Luscombe 8A	2	Landing gear attachment	1973-75	G361	G411
Maule M-4	2	Landing gear shock strut	1965	G116	G123
Douglas DC-8	2	MLG bogie beam	1969-80	G260	G517
McDonnell Douglas F-4	2	Wing lock lug	1973-76	A105	A118
Mooney M-21	2	Propeller blade	1964	F18	F19
Noorduyn Norseman	2	Wing strut eyebolt	1958-63	A56	A67
N. American F-100	2	Wing	1967-68	A84	A86
Northrup F-89 Scorpion	2	Wing	1952	A36	A37
Piper J-3 Cub	2	Wing strut fitting	1947-79	A26	A126
Piper J-3 cub	2	Landing gear float attachment	1965-80	G136	G506
Piper PA-18 Super Cub	2	Propeller blade	1975-78	F148	F205
Piper PA-18 Super Cub	2	Landing gear axle	1966-71	G182	G315
Piper PA-22	2	Wing lift-strut fork	1972-80	A103	A129

TABLE 2 (Cont'd)
LIST OF REPEATED FATIGUE FAILURES - FIXED-WING

AIRCRAFT TYPE	NO. OF ACCIDENTS	FAILURE AREA	ACCIDENT DATES	IDENTIFICATION NUMBER OF ACCIDENTS
Piper PA-22	2	Nosewheel assembly	1974-81	G384 G521
Piper PA-22	2	MLG at weld	1964-76	G65 G419
Piper PA-23 Aztec	2	Prop mounting stud	1967-76	F49 F175
Piper PA-23 Aztec	2	MLG drag link bolt	1976-81	G420 G518
Piper PA-23 Aztec	2	NLG upper drag link	1969-74	G251 G373
Piper PA-24 Commanche	2	Crankshaft	1980-81	E372 E377
Piper PA-24 Commanche	2	Nose gear drag link clevis	1964	G85 G94
Piper PA-25 Pawnee	2	Mixture-control part	1968-71	E106 E141
Piper PA-25 Pawnee	2	Crankshaft	1973-75	E193 E245
Piper PA-25 Pawnee	2	MLG brace tube	1970-72	G268 G320
Piper PA-28 Cherokee	2	Connecting rod	1968-73	E100 E182
Piper PA-28 Cherokee	2	Crankshaft	1971-80	E148 E350
Piper PA-28 Cherokee	2	Engine cylinder	1977-78	E278 E313
Piper PA-28 Cherokee	2	MLG torque link bolt	1977	G440 G442
Piper PA-30 Twin Commanche	2	Propeller blade	1969-71	F86 F101
Piper PA-31 Navajo	2	Propeller blade	1973-79	F126 F208
Piper PA-31 Navajo	2	Hinge on right gear door	1976-80	G418 G503
Piper PA-32 Cherokee SIX	2	Crankshaft	1976-81	E255 E398
Piper PA-32 Cherokee SIX	2	Prop pitch-change dowel	1974-75	F132 F158
Piper PA-36-375 Pawnee Brave	2	MLG leg (radius outboard of fuselage)	1981	G532 G531
Republic F-105	2	Fuselage	1964-65	C13 C15
Saab-Scania Lansen	2	Fuel pipe	1970-72	E135 E166
Scottish Aviation Twin Pioneer	2	Wing V-brace strut	1957	A50 A52
Stinson 108	2	Exhaust valve	1965	E55 E60
Stinson 108	2	Crankshaft	1976-80	E258 E359
Stinson 108	2	Propeller blade	1964-65	F22 F32
Stinson 108	2	Tail wheel attach tubing	1965-67	G126 G205
Stits	2	Horizontal stabilizer attachment	1967-73	B15 B23
Transavia Airtruk	2	Propeller blade	1972-76	F113 F166
Transavia Airtruk	2	MLG attach lugs	1972-79	G317 G473
LTV A-7 Corsair II	2	Nose gear strut	1971	G294 G295
Attack-type US Navy aircraft	2	Wing	approx 1950	A29 A30

TABLE 3

BREAKDOWN OF ACCIDENT TYPES BY YEAR OF ACCIDENT - FIXED-WING

<u>YEAR</u>	<u>WING</u>	<u>TAIL</u>	<u>FUSELAGE</u>	<u>FLIGHT CONTROLS</u>	<u>ENGINE/ TRANSMN</u>	<u>PROP</u>	<u>LANDING GEAR</u>	<u>MISC</u>	<u>TOTAL</u>
1927		1							1
1929					1				1
1930			1						
1932							1		1
1934	1	1							2
1942							1		1
1944							1	1	2
1945	1								1
1946					2	1			3
1947	2				1	1			4
1948	1				1	1			3
1949									0
1950				1		1			2
1951	2				1	2			6
1952	3				3	1			7
1953	3	1			1				5
1954	2	1	2	1			1		7
1955	1				1	1			3
1956	1			1					2
1957	4			1	2		1		9
1958	4		1		1		1		7
1959		1			3	1	10		15
1960	3				5		8		16
1961	3				3	1	7		15
1962	1	1		1	4	2	6		15
1963	4		2		1		3	1	11
1964	7	1	2	2	10	9	52	6	89
1965		1	4	4	30	10	58	3	110
1966	2	1	1		20	12	43		79
1967	5	1	1	3	8	21	31	2	72
1968	4	1		5	11	11	16	2	50
1969	2			1	12	10	21		46
1970	5		1		19	5	30	2	62
1971	5	2	1	1	20	14	23	1	67
1972	3	1		1	20	12	20		57
1973	7	2			21	12	26	1	69
1974	3	3		2	23	13	25		69
1975	2			5	24	18	27		76
1976	3			1	26	18	24	2	74
1977	1	2	1	4	25	11	15	7	66
1978	3	4	1	2	24	18	19	2	73
1979	4	3	1	3	24	8	19	3	65
1980	5		1	6	26	10	26	1	75
1981	4	1		2	30	7	22	1	67

TABLE 4

INITIATION SITES - FIXED-WING

Bolt, Stud, or Screw (108 failures)

A59	A121	A127	A128	B2	B8	B13	D4	D36	E1	E6	E17	E20	E23
E24	E25	E41	E59	E66	E81	E88	E95	E104	E109	E153	E210	E212	E224
E221	E235	E252	E273	E285	E288	E293	E336	E357	E358	E361	F30	F49	F57
F61	F64	F66	F85	F110	F151	F167	F175	G28	G37	G56	G70	G71	G78
G87	G108	G119	G179	G187	G202	G217	G231	G235	G236	G242	G279	G285	G297
G290	G300	G307	G319	G321	G332	G338	G341	G355	G371	G374	G375	G378	G382
G390	G400	G420	G426	G435	G436	G440	G445	G447	G442	G460	G464	G480	G484
G494	G502	G506	G518	G530	G532	G536	H1	H8	H15				

Fastener Hole or Other Hole (72 failures)

A24	A34	A51	A64	A81	A84	A86	A87	A88	A90	A93	A94	A111	A112
A114	A117	A122	A131	A134	B3	B9	B14	B23	C24	C25	E50	E251	E297
E319	E337	F124	G10	G12	G13	G15	G16	G17	G26	G27	G33	G45	G47
G67	G110	G146	G167	G181	G194	G207	G213	G215	G219	G222	G228	G243	G270
G276	G277	G291	G301	G304	G328	G330	G343	G364	G452	G462	G465	G500	G515
G537	G539												

Fillet, Radius, or Sharp Notch (57 failures)

A4-A23	A26	A65	A136	B11	B31	C6	C7	C13	C15	E26	E92	E106	
E144	E157	E263	E320	E369	E376	E388	E393	E404	F1	F13	F45	F96	F196
G39	G40	G42	G59	G193	G227	G360	G407	G493	G523	G531			

Weld (53 failures)

A3	A25	A27	A79	A83	A107	C16	D15	D16	D17	D18	D32	D39	D46
E84	E230	E250	E274	E346	E384	G2	G32	G57	G65	G88	G101	G127	G140
G153	G166	G168	G172	G183	G196	G203	G218	G253	G303	G308	G318	G345	G363
G364	G366	G386	G391	G419	G421	G483	G514	G519	G522	H2			

Corrosion (43 failures)

A98	A122	A128	A137	C9	C21	C23	D22	D39	E194	E197	E247	E330	E364
E368	E384	E388	F39	F62	F86	F97	F172	F183	F220	F225	G49	G326	G335
G349	G350	G379	G395	G430	G424	G454	G479	G487	G512	G517	G520	G525	G529
G540													

Thread (other than bolt or stud) (32 failures)

A26	D34	E44	E85	E111	E117	E198	E355	E364	E383	E400	F14	F16	F24
F113	F127	F129	F143	F162	F171	F177	F214	F215	G5	G21	G69	G85	G94
G173	G189	G212	G463										

Manufacturing Defect (27 failures)

A81	A95	A111	A131	A136	C18	E78	E170	E209	E291	E297	E304	E359	E372
E376	F25	F105	G38	G86	G185	G204	G314	G392	G394	G503	G533	H5	

Scratch, Nick, or Dent (26 failures)

E370	F5	F17	F26	F38	F40	F55	F87	F89	F100	F119	F147	F148	F149
F154	F160	F169	F184	F188	F200	F202	F207	F216	F219	F224	F228		

Fretting (13 failures)

A64	A98	E186	E203	F12	G30	G181	G326	G327	G362	G497	G500	H13
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Surface or Subsurface Flaw (6 failures)

A65	A91	E367	E387	E391	H21
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TABLE 4 (Cont'd)
INITIATION SITES - FIXED-WING

Improper Heat Treatment (4 failures)
E377 F60 G274 H1

Maintenance-Induced Crack (4 failures)
F144 F155 F223 H33

Work-Hardened Area (2 failures)
F133 H20

Wear (2 failures)
G14 G420

Crazing (1 failure)
C22

Belling of Pipe (1 failure)
H35

Rivet (1 failure)
D28

TABLE 5

LIST OF ACCIDENTS BY COUNTRY - FIXED-WING

PART I. CIVIL AIRCRAFT

ARGENTINA A117

AUSTRALIA A25 A33 A69 A76 A88 B34 B36 B37 D40 D46 E110 E111 E122
E141 E142 E181-184 E202 E249-252 E275 E300 E324 E325 E327 E338 E374
E375 F17 F86-88 F106 F118 F119 F130 F161 F181 F190 F216 F226 G7
G235 G243-245 G264-269 G296-302 G317-320 G337-346 G358 G363-366
G388-393 G415-420 G434 G439-442 G453-457 G472-475 G488 G491 G492
G518 G519 H17 H20 H23 H24 H30 H31

AUSTRIA G333

BELGIAN CONGO E7

BELGIUM C21

BRAZIL E59 F6 G44

CANADA A56 A67 A73 A77 A110 A120 A122 A124 A136 B11 B33 C22 D29
D34 D41 E17 E18 E20 E22 E25 E28 E34 E40 E62 E78 E82 E83
E90 E95 E96 E104 E115 E118 E119 E131 E138 E213 E223 E229 E234 E236
E240 E243 E259 E264 E286 E291 E296 E297 E304-306 E313 E319 E331 E337
E339 E351 E357-359 E363 E364 E366 E368 E373 E388 E391 E393 E398 E405
E408 F12 F16 F40 F70 F92 F116 F128 F135 F148 F149 F154 F172 F183
F184 F213 F214 F217 F219 G12 G15 G17 G26 G27 G30 G33-35 G47
G105 G110 G146 G167 G168 G176 G181 G204 G207 G217 G227 G228 G270 G276
G323 G325 G399 G422 G423 G426 G428 G430 G445 G452 G462 G465 G468 G478
G480 G484 G494 G496 G497 G499 G500 G502 G503 G506 G510 G515 G522 G525
G527 G528 G530 G533 G538 G540 G542 H2 H8 H13 H28 H37

CHILE A85 B24

COLUMBIA B25 E89

DENMARK D50

ETHIOPIA A104

FINLAND D5 E197 E217 E267 E335 F218 G371 G397 G408 G541 H3

FRANCE D1 D48 E8 E74 E120

EAST GERMANY A1

GREECE G283

GUATEMALA E13

INDIA A80 E272 G413

TABLE 5 (Continued)
LIST OF ACCIDENTS BY COUNTRY

IRAN G370
IRELAND F10 G450
ISRAEL G405
ITALY C6 C7 E125 E177
JAMAICA E159 E176 E241 F211 G200
JAPAN B14 D36 E247 E312 E381 F127 F143 F160 F196 G410 G438 G483
LYBIA A52 E178 G74
NEW GUINEA A50 F227 G328
NEW ZEALAND A51 A58 A62 A106 C23 E150 E174 E175 E179 E180 E276 F11
F96 F100 F108 F113 F120 F166 F193 F215 G306 G313 G332 G362 G376 G421
G523 G531 G536
NICARAGUA E19 G280
NIGERIA A47
NORTH YEMEN E404
PAKISTAN E27
PHILIPPINES E225
POLAND E353
PUERTO RICO C17 F41 F153 G38 G95 G322
QATAR G516
RWANDA G529
SICILY E9
SINGAPORE D51
SPAIN G292
SOUTH AFRICA E369 H35
SUDAN E203 G25
SWITZERLAND E123
SYRIA E4
TANGANYIKA A42
TURKEY F8

TABLE 5 (Continued)
LIST OF ACCIDENTS BY COUNTRY

UK A96 B1 B2 C20 D4 D19 D26 E1 E5 E15 E29 E30 E101 E102
E132 E198 F97 G6 G23 G351 G357 G406 G470 G497 G482 H1 H34

USA too many to list

VIRGIN ISLANDS E316 F179 G396

WEST GERMANY A2 A123 B32 D24 D30 D33 D35 D42 E218 E228 E238 E257
E258 E268 E271 E280 E284 E292 E293 E309 E314 E322 E336 E370 F57 F157
G353 G354 G360 G372 G385 G398 G400 G401 G409 G432 G437 G446 G451 G463
G535 H29 H36

ZAMBIA B28 G387

PART 2. MILITARY AIRCRAFT

ROYAL AUSTRALIAN AIR FORCE A43 E170 E209 E239 H15

ROYAL AUSTRALIAN NAVY B10 G448 H10

BELGIUM - AIR FORCE E382

CANADIAN FORCES A49 A97 B31 C18 D2 D3 D22 D44 E10 E56 E143
E230 E260

FRANCE - L'ARMEE DE L'AIR A64 A65

ROYAL SWEDISH AIR FORCE A113 A115 A116 E93 E127 E135 E136 E166 E185 E200
E232 E244 E246 E248 E294 E298 E310 E328 E341 E379 E397 H22 H25 H27

UK - ROYAL AIR FORCE A4-23 A118 A125 A130 B3 B8 B9 B13 B18 D23
D45 E370 G1

US AIR FORCE A35-41 A44 A45 A53-55 A60 A70 A71 A74 A84 A86
A90 A91 A93-95 A105 B4 B6 B7 B19-21 C1-5 C11-13 C15
D15-18 E354 E406 E407 F7 G2-5 G294 G295 G493

US AIR FORCE OR US NAVY E161-163

US ARMY E173

US NAVY A29-31 A46 E367

WEST GERMAN AIR FORCE A89

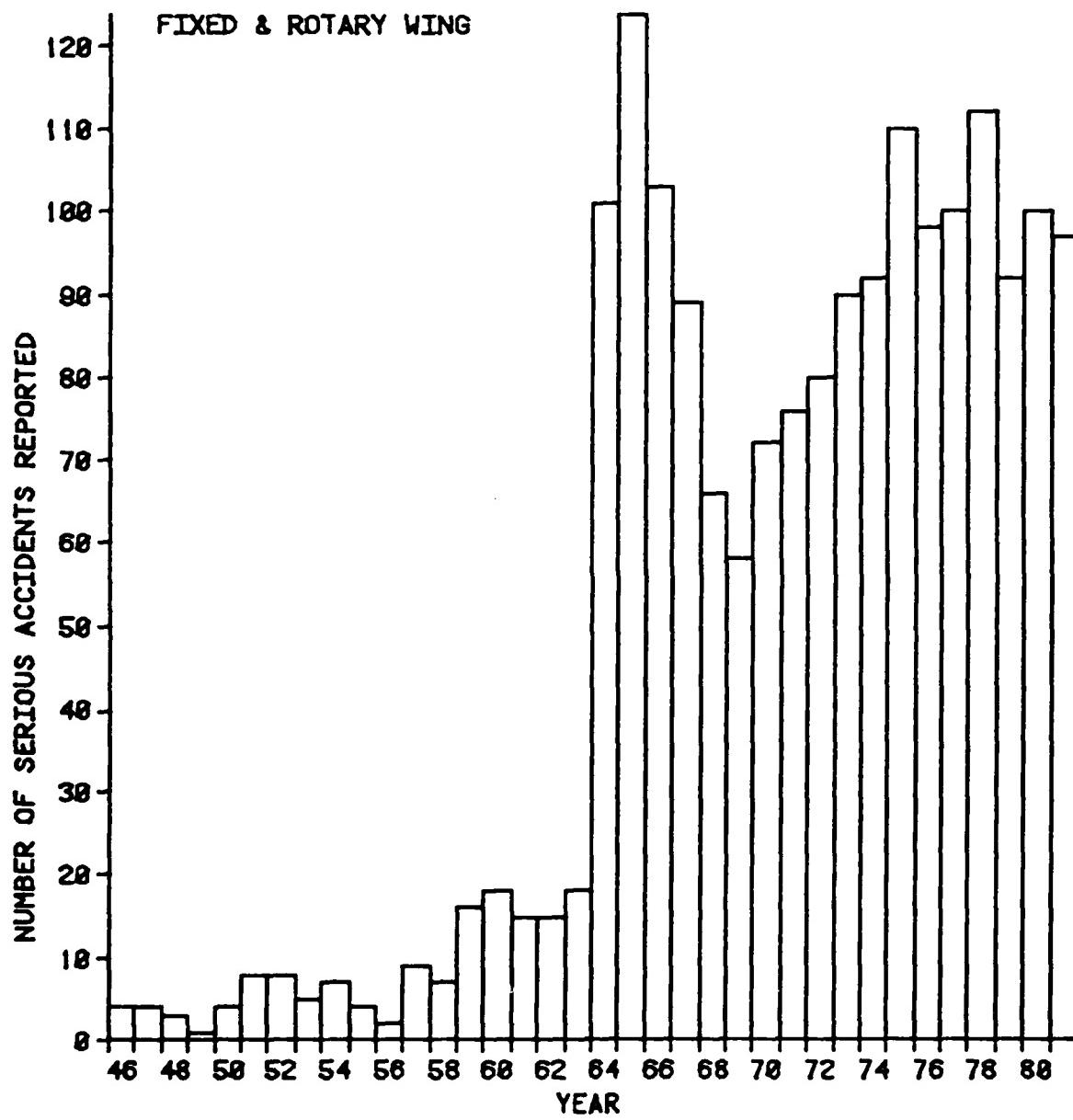


FIG. 1 NUMBER OF SERIOUS FATIGUE ACCIDENTS
- FIXED-WING & ROTARY-WING

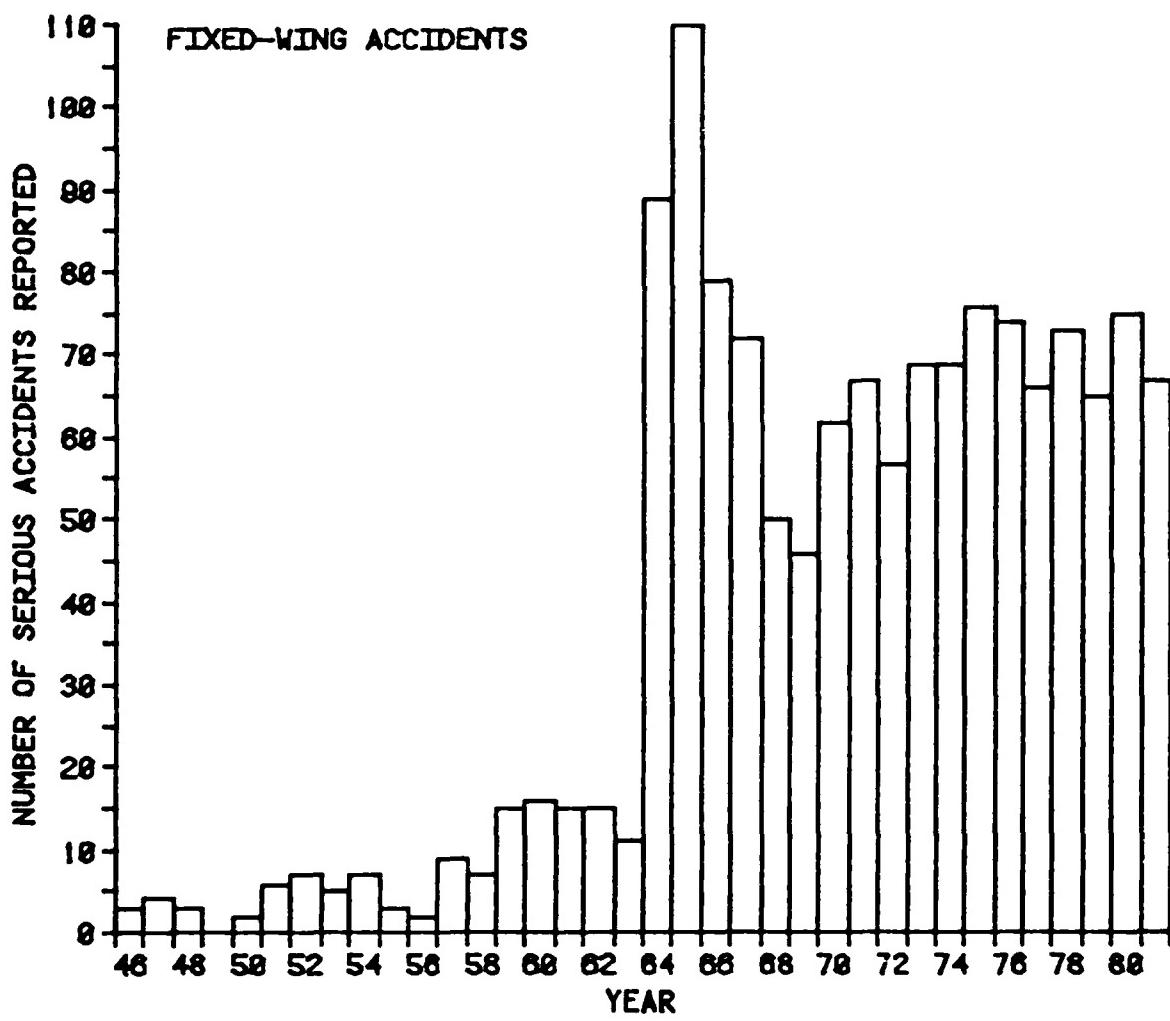


FIG. 2 NUMBER OF SERIOUS AIRCRAFT ACCIDENTS
- FIXED-WING

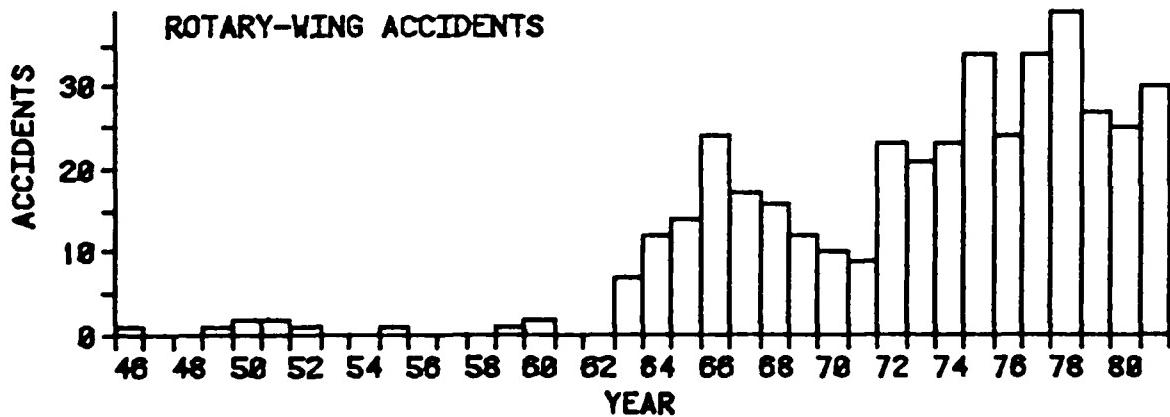


FIG. 3 NUMBER OF SERIOUS AIRCRAFT ACCIDENTS
- ROTARY-WING

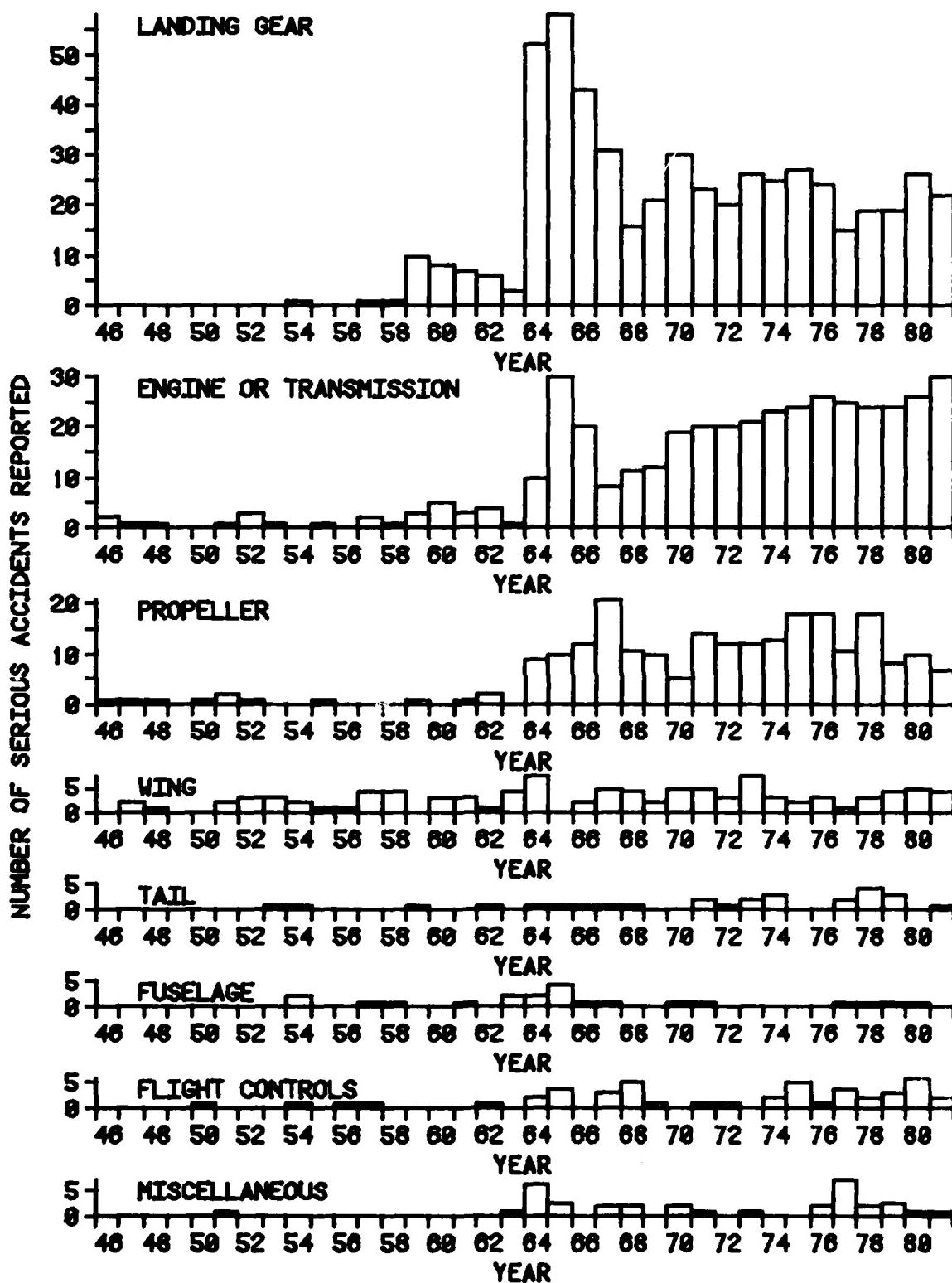


FIG. 4 CAUSES OF FATIGUE FAILURES - FIXED-WING AIRCRAFT

 *
 * PART I
 * LISTING BY FAILURE TYPE
 *

 * APPENDIX A *
 *
 * * FIXED WING AIRCRAFT - WING *

ID No.	Aircraft Type	Accident Date	No. a Dead m	D	Remarks
A1	Dornier Merkur (Luft Hansa)	23 Sep 27	6	D Schleiz, Thuringen, Germany. Wing failure. Wing strut close to upper attachment point. Ref: Brenner, "DYNAMISCHE FESTIGKEIT VON FLUGZEUG-KONSTRUCTIONSTEILEN", DVL Jarbuch 1929, p 149; THE AEROPLANE, 28 Sept 27 p 440; Arnstein & Shaw, METALS & ALLOYS, July 1939, p 206 & 208; and Dornier GmbH files.	
A2	Curtiss AT-32 Condor II (Swissair)	27 Jul 34	11	D Tuttelingen, Germany. Port inter-wing strut failed, causing separation of engine and part of lower wing. Ref: J. Branger, p 9 in Proc. ICAF Symp., Melbourne, 1967; THE AEROPLANE, Aug 8 1934, p 180; L'AERONAUTIQUE, Sept. 1934 p 228.	
A3	Type unknown	pre 1940	1?	D USA? Welded wing strut failed, causing collapse of wing and fatal crash. Ref: "Prevention of the Failure of Metals under Repeated Stress", Batelle, John Wiley, 1941, p. 31.	
A4	Vickers-to Armstrongs	May 42 to 1944	?	D England. Wing failure. Lower spar boom at serration of boom joint outboard of nacelle (WS 41). 20 aircraft lost in a 2-year period. Most failures at WS 41. Airframe hours: 180-400. Ref: UK Ministry of Supply S&T Memo 10/54; Aeron. Research Council R&M No. 2300.	
A23	Wellington (Royal Air Force)				
A24	Junkers Ju 52	WW II	1943?	? D S. America. Wing failure. Spar at a riveted construction in the tension chord. Ref: Gassner in FATIGUE IN AIRCRAFT STRUCTURES, A. Freudenthal (ed), 1956, p. 198.	

A-2

WING FAILURE (FIXED-WING)

- A25 Stinson A2W 10 Jan 45 10 D Spring Plains, Victoria, Australia.
Left wing failure. Joint in welded steel tube between outer & centre sections of wing.
Material: X4130 steel. 13,763 airframe hours.
Ref: Hooke, ARL/STRUC-RPT-363 p 6.
- A26 Piper Cub J-3 26 May 47 2 D Ft. Lauderdale, Fla. USA.
Wing failure at shoulder machined on threaded insert, inner end of left front, lower lift-strut fitting. Ref: AW May 24/48, p 36.
- A27 Beech D18C (All American Aviation) 6 Dec 47 2 D Wellsburg, W. Virginia, USA.
Wing failure. Lower spar cap steel tube at toe of weld, right outboard wing panel. Ref: AMERICAN AVIATION, Dec. 15/47 p 28, & Jan 1/48, p 28; NTSB-AAR-72-33 p 3; & NBS CIRC 550, p. 28
- A28 Martin 2-0-2 (Northwest) 29 Aug 48 37 D Winona, Minn., USA.
Outer panel, left wing separated. Lower front wing root fitting. Material: 75ST. Airframe hours: 1542. Ref: CAB AAI file 1-0117, SA-178, 20 Jun 49; WAAS p. 18/48.
- A29 Attack-type airplane (US Navy) approx 1950 ? ? USA?
Wing failure. Role: dive bombing & rocket launching. Ref: Carl & Wegeng, INVESTIGATIONS CONCERNING THE FATIGUE OF AIRCRAFT STRUCTURES, Proc. ASTM 1954 p. 903.
- A30 Attack-type airplane (US Navy) approx 1950 ? ? USA?
Wing failure. Role: dive bombing & rocket launching. Ref: Carl & Wegeng, INVESTIGATIONS CONCERNING THE FATIGUE OF AIRCRAFT STRUCTURES, Proc. ASTM 1954 p. 903.
- A31 Piston-engine fighter (US Navy) approx 1950-52 ? ? USA?
Wing failure. Role: training in ground support tactics, rocket launching runs. Ref: Carl & Wegeng, INVESTIGATIONS CONCERNING THE FATIGUE OF AIRCRAFT STRUCTURES, Proc. ASTM 1954 p. 903.
- A32 Vickers Viking 1951 0 S Central Africa.
Inspection found centre-section spar boom completely failed. Failure probably occurred with "bang" 3 months previously, but post-flight inspection could not locate failure at that time. Matl: DTD 464 (equiv 24ST). 6800 airframe hrs. Ref: J.K. Williams, p 108 in Gassner & Schutz, FATIGUE DESIGN PROCEDURES.
- A33 D.H. 104 Dove 15 Oct 51 7 D Kalgoorlie, Western Australia.
Left wing failure. Crack in channel section, centre section spar. Matl: DTD 363 (equiv 75ST). 8977 airframe hours. Ref: Hooke, ARL/STRUC-RPT-363, p. 9

A-3
WING FAILURE (FIXED-WING)

A34 Douglas DC-6	1952	0	S ?	Failure of front spar cap, and bottom skin and stringer panel between front & centre spar cap. Origin: bolt hole connecting engine attachment angle to front spar. Material: 75ST. 13,000 airframe hours. Aircraft landed safely. Ref: J.K. Williams, p 102 in Gassner & Schutz, FATIGUE DESIGN PROCEDURES, 1969.
A35 Convair B-36 (USAF)	1952 or 1953	? ? ?		Wing failure. Ref: J.D. Caldara, p 23 & x in WADC TR 59-507, 1959.
A36 Northrup F-89C Scorpion (USAF)	1952	? D ?		Wing failure, wing-fuselage fitting. Ref: AW Dec. 1/52, p 16, & Oct. 20/52, p 52
A37 Northrup F-89 Scorpion (USAF)	Sep 52	2	D Detroit, USA. Right wing failure, wing-fuselage fitting. Ref: AW Dec. 1/52, p 16 & Sept. 15/52, p 17	
A38 Republic F-84 Thunderstreak (USAF)	1953	? ? ?		Wing failure. Ref: J.D. Caldara, p 20 & x in WADC TR 59-507, 1959.
A39 Boeing B-52 Stratofortress (USAF)	1953-59	? ? ?		Wing failure. Ref: J.D. Caldara, p 25 in WADC TR 59-507, 1959.
A40 Boeing B-52 Stratofortress (USAF)	1953-59	? ? ?		Wing failure. Ref: J.D. Caldara, p 25 in WADC TR 59-507, 1959.
A41 N. American F-51 Mustang (USAF)	1953-59	? ? ?		Wing failure. Ref: J.D. Caldara, p 29 in WADC TR 59-507, 1959.
A42 Vickers Viking (CAA)	29 Mar 53	13	D Mtara, Tanganyika. Wing failure. Single-spar mainplane joint, lower spar boom, WS 141. Material: DTD 363 (equiv to 75ST). Airframe hours: 8800. Ref: J.K. Williams, 4th ICAF Proc., Munich, 1965, p. 103; WAAS, p. 7/53.	
A43 Bristol 170 Freighter (RAAF)	25 Nov 53	2	D Mallala, South Australia. Wing failure in high-load high-speed manoeuvre. Fatigue crack reduced strength below design strength, but not necessarily below limit strength. Lower surface of torsion box on joint between rear lower skin angle and inter-span skin. Ref: Hooke, ARL Report SM224.	
A44 North American F-86F Sabre (USAF)	Nov 54	? D	Nellis Air Force Base, Nevada USA. Wing failure at under-wing aluminum attach bars. Ref: AW Nov 15/54 p 7, & Nov. 29/54, p 16	

A-4

WING FAILURE (FIXED-WING)

- A45 North American F-86H Sabre (USAF) Nov 54 ? D Nellis Air Force Base, Nevada USA.
Wing failure at under-wing aluminum attach bars. Ref: AW Nov 15/54 p 7, & Nov. 29/54, p 16
- A46 N. American FJ-4 Fury (US Navy) 1955-59 1 D ?
Wing failure (bolt holes). Role changed from fighter to fighter-bomber. Ref: Keen, p 121 in WADC TR 59-507, 1959.
- A47 Bristol 170 Wayfarer (West African Airways) 5 Feb 55 13 D Lagos, Nigeria.
Left wing failure, doubler plate of spar.
Ref: WAAS p. 3/55
- A48 Cessna 140 1956 ? D USA.
Wing failure. Lift strut fitting. Ref: Australian DoT.
- A49 Lockheed/ Canadair T-33 Silver Star (Canadian Forces) 29 May 57 1 D Zweibrucken, Germany.
Port wing failed from crack in spar cap (lower front) near attachment fitting. Ref: CF ACAIRS.
- A50 Scottish Aviation Twin Pioneer (Kroonduif) 30 Aug 57 3 D Off Jahlen Island, New Guinea.
Separation of right wing. Failure of V-brace strut. Ref: WAAS p. 15/57
- A51 Bristol 170 Freighter (Straits Air Express) 21 Nov 57 4 D Christchurch, New Zealand.
Wing failure. Lower boom of starboard outer wing, front spar joint at last bolt hole. Material: DTD 364 (equiv. 24ST).
Airframe hours: 7900. Ref: Williams, 4th ICAF Proc., 1965, p. 105; ICAO AAD 10, 1961
- A52 Scottish Aviation Twin Pioneer 7 Dec 57 6 D Fezzan, Libya.
Failure in forward tube of V-brace strut, port wing. Outer wing panel separated.
Material: 4T2 steel. Airframe hours: 564.
Ref: ICAO AAD No. 9, 1959, p.241
- A53 Boeing B-47 Stratojet (USAF) 1958 3? D USA.
Wing separation. Longeron failure. Role: Low Altitude Bombing System. Ref: AW May 11/59, p 33 & Dec. 15/58, pp 71-75.
- A54 Boeing B-47 Stratojet (USAF) 1958 3? D USA.
Wing separation. Longeron failure. Role: Low Altitude Bombing System. Ref: AW May 11/59, p 33 & Dec. 15/58, pp 71-75.
- A55 Boeing B-47 Stratojet (USAF) 1958 3? D USA.
Wing separation. Longeron failure. Role: Low Altitude Bombing System. Ref: AW May 11/59, p 33 & Dec. 15/58, pp 71-75.

A56 Noorduyn Norsemann V	15 Sep 58	1	D Nanika, Ont. Canada. Wing failure. Rear front eyebolt, attaching diagonal wing strut to front spar of right wing. Ref: MoT Canada file 5008-B19-10
A57 Cessna 195	1960	1?	D USA. Wing failure, wing carry-through. Ref: Australian DoT.
A58 Cessna 180	1 Mar 60	1	D Mendip Hills, New Zealand. Wing failure. Starboard rear spar (root end). Crack probably initiated in ground-loop 3 months previously. Role: agricultural fertilizing. Airframe hours: 1813. Ref: NZ AIB Report 25/3/1060.
A59 Curtiss C-46F (Capitol Airlines)	15 Oct 60	2	D Plain City, Utah USA. Right wing separated. Lower attach angle bolts holding forward portion of outer wing to centre section. Ref: WAAS p 24/60
A60 Boeing B-52 (USAF)	1961?	?	D USA? Wing failure. Ref: McCarthy, AEROSPACE HISTORIAN, March 1982, p. 52.
A61 Beech 35 Bonanza	25 Mar 61	1?	D Brookfield, Mass. USA. Wing failure. Centre-section steel truss. Ref: CAB Structures Report dated 14 June/63 on May 13/63 accident.
A62 Aero Commander 680S	21 Nov 61	6	D Mount Ruapehu, New Zealand. Separation of right wing. Lower spar cap, front spar at WS 24. Upper & lower rear spar caps had failed sometime previously from single load of unknown origin. Airframe hours: 5040. Ref: NZ AIB Report Report 25/3/1192.
A63 Beech 35 Bonanza	30 Sep 62	1?	D Parsons, Kansas USA. Wing failure. Centre-section steel truss. Ref: CAB Structures Report dated 14 June/63 on May 13/63 accident.
A64 Military bomber (French)	approx 1963	?	D France? Wing failure. Lower boom, forward spar, 2014 forging. Origin: fretting at bolt hole edge. Ref: Barrois, AGARD-AG-176, pp 334-5.
A65 Old military aircraft (French)	approx 1963	?	D France? Wing failure. Lower boom, forward spar, 2014 forging. Origin: flaw at external sharp angle. Ref: Barrois, AGARD-AG-176, pp 334-5
A66 Cessna 195	1963	1?	D USA. Wing failure, wing carry-through. Ref: Australian DoT.

A-6

WING FAILURE (FIXED-WING)

- A67 Noorduyn 22 Jan 63 1 D Pickle Lake, Ont. Canada.
Norseman V
seaplane Left wing failure. Upper forward strut eyebolt.
Ref: ICAO AAD no. 15 Vol. II, 1967, p 134.
- A68 Beech 35 13 May 63 1? D Perry, Oklahoma USA.
Bonanza Failure of left wing. Forward centre-section
steel truss at wing-fuselage attachment.
Material: steel. Airframe hours: 4132. Ref: CAB
Structures Report dated 14 June/63.
- A69 de Havilland 10 Sep 63 1 D Armidale, Australia.
DHC-2 Beaver Wing failure (strut attachment fitting). Ref:
Australia DoT
- A70 Douglas B-26 7 Jan 64 2 D Vietnam.
Invader Wing failure, main spar. Role: counter-insur-
(USAF) gency. Ref: LIFE magazine, 8 May 64 p 34D & 29
May 64 p 23; Francillon, MCDONNEL DOUGLAS AIR-
CRAFT SINCE 1920, p. 359; Wagner, AMERICAN
COMBAT PLANES, 3rd edition, p.189.
- A71 Douglas B-26 9-15 2 D Vietnam.
Invader Wing failure, main spar. Role: counter-insur-
(USAF) gency. Ref: LIFE magazine, 8 May 64 p 39;
Francillon, MCDONNEL DOUGLAS AIRCRAFT SINCE
1920, p. 359; Anderton, THE HISTORY OF THE U.S.
AIR FORCE.
- A72 Mooney M-18C 31 Mar 64 1 D Roanoke Rapids, N.C. USA.
Wing failure (spar). Ref: NTSB file 2-1036
- A73 Aero 1 Apr 64 4 D Thompson, Man. Canada.
Commander Separation of right wing. Front spar lower
680E cap, WS 24. Airframe hours: 5949. Role:
low-level surveys. Ref: MoT file C-30139;
ICAO AAD No. 16, vol. I, 1968, p. 138.
- A74 Douglas Apr 64 2 D Elgin Air Force Base, Fla. USA.
B-26 Left wing separated. Failure of lower spar
Invader cap. Role: Ground-attack strafing. Ref:
(USAF) AWST Apr. 13/64, p 30, & May 4/64, p 13.
- A75 Beech G18S 16 Jul 64 4 D Toadlena, New Mexico, USA.
Wing failure, WS 81. Ref: NTSB file 2-0912
- A76 de Havilland Jul 64 1 D Australia.
DHC-2 Beaver Wing failure (strut attachment fitting). Ref:
Australia DoT
- A77 Piper PA-18 11 Jun 66 1 D Moose Jaw, Sask. Canada.
Super Cub Right wing failure (rear strut fork end).
Problem brought about by repeated heavy
loadings imposed by crop spraying and rough
field operations. Ref: MoT Canada File 2969

A-7
WING FAILURE (FIXED-WING)

- A78 Beech C18S 15 Aug 66 4 D Anchorage, Alaska USA.
 Right wing failed. Fracture adjacent to landing gear slide cluster. Ref: NTSB file 2-1183
- A79 Beech C-45H 28 Feb 67 2 D Middletown, Del. USA.
 Left wing failure. Lower cap of spar at weld approx 8 inches outboard of outer panel attach point. Ref: NTSB file 2-0164
- A80 HAL Pushpak Sep 67 1? D Jaipur, India.
 Wing failure. Lift strut lower-rear attach lug. Ref: Australian DoT.
- A81 Aero Commander 560E 27 Sep 67 7 D Dallas, Texas USA.
 Left wing failure (spar). Two overlapping rivet holes found in aft leg of spar cap. Ref: NTSB file 2-1000
- A82 Beech E18S 28 Apr 67 1 D Acworth, Georgia USA.
 Wing failure at WS 81, lower left spar (elliptical steel tube). NTSB file 2-0854
- A83 Piper PA-25 Pawnee 11 Aug 67 1 D Coweta, Okla. USA.
 Right wing failure. Spar lugs, wing attach fitting, improper weld. Role: aerial application. Ref: NTSB file 2-1044
- A84 N. American F-100 Super Sabre (USAF) 1967 or 68 1? D Nellis AFB, USA.
 Wing failure at Wing Canted Station 102, lower skin 51% spar bolt holes. Matl: 7075-T651. 2140 airframe hours. Ref: Fitch, AFFDL TR 70-144, pp 742, 746 & 749; AGARD CP-118 p. 5-10
- A85 Douglas DC-3 8 Apr 68 36 D Coyhaique, Chile.
 Starboard wing failure. Ref: Finch, p 2.4/49 in PROCEEDINGS 10TH ICAF SYMPOSIUM, Brussels 1979; & WAAS.
- A86 N. American F-100D Super Sabre (USAF) 21 Oct 68 0 D Laughlin AFB, Del Rio, Texas USA.
 Wing failure at Wing Centre Section, lower-cover outer-skin bolt hole. Matl: 7075-T6. 2890 airframe hr. Role: Thunderbirds demo team. Ref: Fitch, AFFDL TR 70-144, pp 742, 746, 749
- A87 Fairchild Hiller F27-B (Wien Consolidated) 2 Dec 68 39 D Pedro Bay, Alaska, USA.
 Separation of right wing, WS 197. Cracks at fastener holes in wing skin at tank access door. Ref: NTSB file 1-0038; NTSB AAR-70-16
- A88 Vickers Viscount 720C (MacRoberson-Miller Airlines) 31 Dec 68 26 D Port Hedland, Western Australia.
 Separation of starboard wing. Main spar lower boom, WS 143. Fatigue endurance reduced by insertion of flared bushings. Ref: ICAO AAD No. 19 1973, p. 71.

A-8

WING FAILURE (FIXED-WING)

- A89 Lockheed pre-Dec/69 1 D Luke AFB, USA.
F-104G Separation of right wing. Lower skin access
(German AF) cutout, WS 80.7. Ref: AGARD CP-141, p.
5-11 & AFFDL TR 72-80, p. 3-29.
- A90 McDonnell 16 Dec 69 0 S USA?
F-4 Failure of left outer wing. Knife-edge fastener
Phantom II holes in lower torque-box skin, outboard lower
(USAF) wing. Aircraft recovered safely. 1700 airframe
hours. Ref: AGARD CP-118 p. 5-5 & 5-14.
- A91 General 22 Dec 69 2 D Nellis AFB, Nevada USA.
Dynamics Left wing separated. Lower attachment plate
F-111 of wing pivot assembly contained an initial
(USAF) flaw (D6ac steel). Airframe hours: 105.
Ref: "F-111 GENERAL DYNAMICS" by Gunston,
1978; AGARD CP-221, p. 3-2.
- A92 DH 104 Dove 28 Jan 70 9 D Cleveland, Ohio, USA.
(TAG Airline) Wing separation. Lower right wing/fuselage
root joint attach fitting. Material: steel.
Airframe hours: 9384. Ref: NTSB file 3-1541
- A93 McDonnell 26 Feb 70 0 S USA?
F-4 Failure of left outer wing. Knife-edge fastener
Phantom II holes in lower torque-box skin, outboard lower
(USAF) wing. Aircraft recovered safely. 1259 airframe
hours. Ref: AGARD CP-118 p. 5-5 & 5-14.
- A94 McDonnell 18 Mar 70 0 S USA?
F-4 Failure of right outer wing. Knife-edge fastener
Phantom II holes in lower torque-box skin, outboard
(USAF) lower wing. Aircraft recovered safely. 464
airframe hours. Ref: AGARD CP-118 p 5-5 & 5-14.
- A95 Northrup 20 Apr 70 1 D Williams AFB, USA.
F-5A Wing separation, centre wing lower skin.
(USAF) Tool damage caused initial crack. Ref: NASA
SP-309, p. 235; US Army AMMRC MS 77-5, p 1.5.6
- A96 Morovan 3 Jun 70 0 D UK.
Zlin Z526A Failure of centre-section, lower spar boom,
left wing inboard of undercarriage leg.
Aircraft crash landed successfully. A/F hours:
453, mainly aerobatics. Ref: UK CAA Rept 15/71
- A97 Lockheed 25 Mar 71 0 D Cold Lake, Alta. Canada.
CF-104 Starfighter Wing failure (lower skin). Skin had wrong grain
(Canadian Forces) direction. Ref: Canadian Forces.
- A98 DH 104-7 AXC 6 May 71 12 D Coolidge, Ariz. USA.
Dove Right wing failure. Lower main root joint fit-
(Apache ting. Fatigue propagated in area of corrosion &
Airlines) fretting. Ref: ICAO AAD No. 20, 1974, p 113;
NTSB AAR-72-19

A99 Bowers Fly Baby 1-A	20 May 71	0	D Oxford, Conn. USA. Left wing failure. Flying-wire turnbuckle failed. Pilot parachuted. NTSB file 3-1309
A100 Helio H-295 Super Courier	21 Aug 71	3	D Sitka, Alaska, USA. Separation of left wing, lower attachment fitting. Ref: NTSB file 3-2106
A101 Piper J-4A	4 Dec 71	0	D Boise, Idaho USA. Failure of left wing. Lift strut, fuselage attach clevis broke. Previous landing incident. Ref: NTSB file 3-4040.
A102 Beech E18S (Aero Taxi)	22 Jun 72	1	D Cleveland, Ohio, USA. Left wing separated. Lower spar cap, WS 81. Crack missed during prior inspection. Airframe hours: 8227. Ref: NTSB-AAR-72-33
A103 Piper PA-22	19 Jul 72	0	S Eden Prairie, Minn. USA. Right wing lift strut fork. Precautionary landing made. NTSB file 3-2600.
A104 Douglas DC-3	10 Sep 72	11	D Dabark, Ethiopia. Right wing separated. Wing-to-centre section attachment. Ref: ICAO ADREP 361/72
A105 McDonnell F-4 Phantom II (USAF)	Jan 73	?	D Nellis AFB, USA Port wing failure, lower lock lug. Ref: US Army AMMRC MS 22-5, p. 1.5.9.
A106 Douglas DC-3 (Southern Air Super)	23 Feb 73	1	D Seddon, New Zealand. Separation of right wing. Lower centre wing wrap-around & internal doublers, inboard of WS 142. Role: fertilizing. Airframe Hours: 24,261 including 1503 in agricultural role. Ref: NZ AAR 73-032.
A107 Beech E18S (Air Iowa)	19 Apr 73	6	D Davenport, Iowa. USA. Separation of right wing. Lower spar cap, WS 81, at weld in spar. Crack missed in previous inspections. NTSB Rept AAR-73-18
A108 Piper PA-25 Pawnee	24 Aug 73	0	D Rayville, La. USA. Wing separation. Fracture of spar. Role: aerial application. NTSB file 3-3681
A109 Piper PA-25 Pawnee	1 Oct 73	0	D Rohwer, Ark. USA. Right wing separated. Rear mount bracket and front spar broken at mount bracket. Role: aerial application. NTSB file 3-2775
A110 Beech D18S on floats	16 Oct 73	1	D Thompson, Man. Canada. Separation of wing. Left wing lower spar cap. Crack undetected in prior x-ray. Ref: MoT Canada file C30139.

WING FAILURE (FIXED-WING)

- A111 Piper PA-25 18 Oct 73 1 D Slaton, Texas, USA.
Pawnee Wing failure (spar). Initiation at improperly drilled rivet hole. Role: aerial application. Ref: NTSB file 3-4148
- A112 Lockheed 23 May 74 4 D Springfield, Ill. USA.
382E Hercules (Saturn Airways) Separation of port wing. Outer WS 162, lower front spar cap (1st fastener hole). Material: 7075-T6511. Airframe hours: 18,837. Ref: NTSB-AAR-75-5
- A113 Saab-Scania 11 Jul 74 0 D Just south of Lake Vanern, Sweden.
AJ37 Viggen (Swedish AF) Port wing failure. Main spar, close to root. Ref: Saab-Scania FKHU-81.27.
- A114 Lockheed 30 Oct 74 4 D Bettles, Alaska, USA.
382B Hercules Separation of right wing. Fastener holes in lower hat section, skin panels, No. 3 engine compressor diffuser case, centre WS 183. Ref: NTSB file 3-0519
- A115 Saab-Scania 6 Oct 75 0 D Lake Vanern, Sweden.
AJ37 Viggen (Swedish AF) Port wing failure. Main spar, close to root. Ref: Saab-Scania FKHU-81.27.
- A116 Saab-Scania 10 Oct 75 0 D Baltic Sea near Sweden.
AJ37 Viggen (Swedish AF) Right wing failure. Main spar, close to root. Ref: Saab-Scania FKHU-81.27.
- A117 Hawker 14 Apr 76 34 D Cutral-Co, Argentina.
Siddley HS 748 (YPF State Enterprise) Separation of right wing. Crack origin at rivet holes of reinforcing plate by external rib of engine. Material: BS L72. Airframe hours: 25,760. Ref: ICAO ADREP 131/76
- A118 McDonnell 23 Jul 76 0 D Coningsby, UK.
Douglas F-4M Phantom II (Royal AF) Wing failure. Outer wing fold lug, aft lock lug. Loads caused by buffeting. Ref: RAF.
- A119 Boeing B-17G 17 Aug 76 0 S Cordele, Ga. USA.
Left front spar, lower cap centre section, P/N 753424-2 cracked. 1/2" outboard of inboard bolt of aft terminal plate, 8" inboard of inboard jack pad. Airframe hours: 5546. Role: spraying. Aircraft landed safely. Ref: NTSB file 3-3899.
- A120 FFA 17 Apr 77 1 D Omemee, Ont., Canada
Diamant 16.5 sailplane Separation of right wing. Crack in root web. Areas of root web had a lack of bonding. Material: fiberglass. Airframe hours: 784. Ref: MoT Canada file 070033.

A-11
WING FAILURE (FIXED-WING)

- A121 Piper PA-22 18 Feb 78 2 D Camden, Tenn. USA
 Right wing failed (strut attach bolt).
 Unapproved mod: probe attached to wing
 strut. Ref: NTSB file 3-0444
- A122 Helio H-295 15 Aug 78 4 D Amai Inlet, BC, Canada.
 Wing separation. Lower left carry-through
 fitting in bottom portion of lug at wing
 attachment bolt hole. Origin: corrosion pitting
 in bolt hole bore. Airframe hours: 1178.
 Aircraft damaged in prior accident. Ref:
 MoT Canada file P80084.
- A123 Let L-13 19 Nov 78 0 D Kamp-Lintfort, W. Germany.
 Blanik
 sailplane
 Spar failure, left wing, during looping.
 Fatigue probably because of earlier over-
 stress. Occupants parachuted. Ref: West
 German file 3X0479.
- A124 Beech A90 1 May 79 2 D Sherrington, Que. Canada.
 King Air
 (Transport
 Canada)
 Right wing separated. Bathtub fitting
 joining centre section to outer wing. Role:
 low-level navaid calibration. Airframe
 hours: 5466. Matl: 2014-T6. Ref: MoT Canada
 file 79-H90002
- A125 British 12 Jul 79 2 D Osnabruck, W. Germany.
 Aerospace
 Buccaneer
 (Royal AF)
 Wing separated. Main spar latch pin, wing-fold
 joint. Ref: RAF & FI 22 Dec/79, p. 2048.
- A126 Piper J-3C 27 Aug 79 0 D Auburndale, Florida USA.
 Right wing failed. Rear inboard strut clevis.
 Ref: NTSB file 3-3800
- A127 Bayles 13 Oct 79 2 D Jackson, Tenn. USA..
 Special 1
 Separation of wing. Bolt holding rear strut
 to fuselage failed. Ref: NTSB file 3-3433.
- A128 Beech 200 22 Jan 80 0 S Zanesville, Oh. USA.
 Super King Air
 Fatigue fracture of lower forward wing attach
 bolt. Stress corrosion where CD plate scored.
 Ref: NTSB file 3-1137.
- A129 Piper PA-22 2 Feb 80 2 D Princeton, Ill. USA.
 Wing failure, right front lift-strut fork
 en. Ref: NTSB file 3-0415
- A130 British 7 Feb 80 2 D Nellis AFB, Nevada, USA.
 Aerospace
 Buccaneer S.2B
 (Royal AF)
 Right wing failure. Mainplane inner-front spar.
 Ref: FI 9 Aug. 80, p. 510 & 16 Aug. 80, p. 587.

A-12

WING FAILURE (FIXED-WING)

A131	Piper PA-25 Pawnee	2 Aug 80	1	D	Dumas, Texas USA. Left wing failed (spar) where lower flange was mis-drilled. Role: crop spraying. Ref: NTSB file 3-3345.
A132	Piper PA-20 Pacer	26 Nov 80	3	D	East Berlin, Pa. USA. Right wing failure. Strut lower fork assembly. Ref: NTSB file 3-3206.
A133	Piper PA-24 Commanche	1981 or 82	?	?	Failure of wing lower spar cap. Ref: Canadian General Aviation News, Dec/82 p 31; & US Airworthiness Directive AD 81-19-01.
A134	Douglas B-26 (Calspan variable-stability aircraft)	3 Mar 81	3	D	Near Edwards AFB, Cal. USA. Left wing failure. Front lower forward spar cap at WS 140 (most outboard bolt hole attaching spar to nacelle fittings). 9467 airframe hours. Ref: NTSB file 3-3360.
A135	Hall Cherokee II (sailplane)	2 May 81	1	D	Valyermo, Ca. USA. Glider pitched up, breaking tow rope. Wings separated. Pre-existing cracks in wood spars. Ref: NTSB file 3-2441.
A136	de Havilland DHC-2 Beaver	1 Aug 81	1	S	Big Hook Lake, Ont. Canada. Left wing separated (upper fitting of strut assembly). Strut had improperly-formed fillet radius and was not removed from service as per AD. 7228 airframe hr. Ref: DoT Canada file 81-C10088.
A137	Beech E90 King Air	26 Oct 81	1	D	Mineral Wells, Texas USA. Left wing separated. Lower-wing forward attachment bolt failed from fatigue corrosion. Ref: AWST Nov. 9/81, p. 26.

Total Fatalities: 400

* APPENDIX B *
* FIXED-WING AIRCRAFT - TAIL *

ID No.	Aircraft Type	Accident Date	No. a Dead m	D	Remarks
B1	Junkers F.13 (Walcot Airlines)	21 Jul 30	6	D	Meopham, Kent UK. Breakage of tailplane from severe buffeting from air eddies produced by the wing. Ref: THE AEROPLANE 28 Jan/31 pp 138-142; Nissen, AIRCRAFT ENGINEERING, Oct/40 p 293; Teed, p 264 in J.A. Pope, METAL FATIGUE, 1959.
B2	Handley Page W.10	22 Sep 34	4	D	Aston Clinton, England. Fracture of main bolt securing the bracing wire to front spar of the tailplane, allowing tailplane to twist. Airframe hours: 5000. Ref: THE AEROPLANE, 7 Nov. 34, p 545.
B3	Hawker Typhoon (RAF)	WW II	1	D	UK? Tail failure. Origin: rivet hole. Possibly several additional accidents. Ref: Teed, pp 264-265 in J.A. Pope, METAL FATIGUE, 1959; Owen, UK ARC R&M 2688.
B4	Curtiss SB2C Helldiver (USAF)	WWII	?	D	?
					Lost horizontal tail. Cracks found in tails of other SB2C and Brewster SB2A aircraft. Attributed to structural response to unsteady airloads. Ref: L. Douglas, AHS Spec. Meeting on Helicopter Fatigue Methodology, 1980, p.4
B5	Type unknown (probably US military)	pre-1945	?	D	USA? Vertical tail separated. Crack in stabilizer rear spar attachment to fuselage, starting at free edge of 0.051 Al alloy. Failures after 2000 flight hours. Ref: Davis, "Fatigue Failure of Aircraft Parts", AUTOMOTIVE & AVIATION INDUSTRIES, May 1/45, p. 72.
B6	N. American F-51 Mustang (USAF)	1953-59	?	?	?
					Tail failure. Ref: J.D. Caldara, p 29 in WADC TR 59-507, 1959.
B7	Convair B-36 (USAF)	1953-59	?	?	?
					Tail failure. Ref: J.D. Caldara, p 23 in WADC TR 59-507, 1959.
B8	Handley Page Hastings C.1 (RAF)	Jan 53	?	?	Fayid, Egypt. Elevator outer hinge-bolts. Ref: Barnes, HANDLEY PAGE AIRCRAFT SINCE 1909, p 457.

TAIL FAILURE (FIXED-WING)

- B9 Handley Page 14 Jul 54 4 D Cranfield, UK.
 H.P.80 Victor
 prototype
 Tailplane separated. Cracks around bolt holes in fin allowed 3 bolts securing tailplane to loosen and shear. Ref: Barnes, HANDLEY PAGE AIRCRAFT SINCE 1907, p. 506.
- B10 Fairey 30 Jan 59 1 D Sydney, Australia.
 Gannet
 (RAN)
 Tail plane assembly detached. Ref: Royal Australian Navy.
- B11 Cessna 150 4 Nov 62 0 D Prince Albert, Sask. Canada.
 Bottom flange of rudder spar. Origin: bend radius of flange. Role: aerobatics. Ref: MoT Canada file 1827
- B12 CallAir 24 Aug 64 0 S Bainbridge, Ga. USA.
 A-5T
 Left stabilizer attach tube. NTSB file 3-2615.
- B13 Handley Page 6 Jul 65 41 D Dorchester, England.
 Hastings
 (Royal Air Force)
 Upper two attachment bolts of the starboard elevator outrigger. Ref: FI 5 Aug. 65, p. 240.
- B14 Boeing 5 Mar 66 124 D Mt. Fuji, Japan.
 707-436
 (BOAC)
 Vertical stabilizer separated. Gust load considerably in excess of design limit. Fatigue cracks in vertical stabilizer rear spar, starboard attachment fitting (bolt holes). 19,532 hours. Test on similar fitting with cracks failed at 110% limit design load. Ref: UK Board of Trade CAP 286, 1967.
- B15 Glendening 24 Dec 67 1 D Corona, Calif. USA.
 Stits
 Left horizontal-stabilizer attach fitting. Ref: NTSB file 2-1030
- B16 Cessna 12 Dec 68 0 S North Iliamna, Alas. USA.
 150
 Rudder at vertical spar. NTSB file 3-4306.
- B17 Cessna U206B 19 Sep 71 1 D Anchorage, Alaska, USA.
 Vertical fin & rudder separated, cracks at attach points. Ref: NTSB file 3-2304
- B18 Folland 13 Dec 71 2 D Upper Heyford, UK.
 Gnat T Mk 1
 (Royal AF)
 Fin separated (attachment lugs). Role: aerobatic demonstration team. Ref: RAF.
- B19 McDonnell pre-1972 0 S ?
 Douglas F-4
 Phantom II
 (USAF)
 Outer portion of stabilator separated at SS 51.85 splice rib. Origin: aft edge of Al skin. 500 airframe hours. Aircraft recovered safely. Ref: Miller & Lowndes in AGARD CP 118, p. 5-5.

B20	McDonnell Douglas F-4 Phantom II (USAF)	pre-1972	0	S ?	Outer portion of stabilator separated at SS 51.85 splice rib. Origin: aft edge of Al skin. Aircraft recovered safely. Ref: Miller & Lowndes in AGARD CP 118, p 5-5.
B21	McDonnell Douglas F-4 Phantom II (USAF)	pre-1972	0	S ?	Outer portion of stabilator separated at SS 51.85 splice rib. Origin: aft edge of Al skin. 1540 airframe hours. Aircraft recovered safely. Ref: Miller & Lowndes in AGARD CP 118, p. 5-5.
B22	Pitts S-2A Special	3 Aug 72	0	S	Miami, Fla. USA. Forward attach tube of right horizontal stabilizer. Role: aerobatics. NTSB file 3-1132
B23	Stitts SA-3A Playboy	10 Jun 73	1	D	Macomb, Illinois USA. Horizontal stabilizer failed. Lead edge mount tube broken at attach hole. NTSB file 3-4148
B24	Curtiss C-46A	17 Dec 73	3	D	Coyhaique, Chile. Elevator separated (elevator hinge pins?). Ref: Finch, p 2.4/49 in PROCEEDINGS 10TH ICAF SYMPOSIUM, Brussels 1979; & WAAS.
B25	Vickers Viscount 785 (Taxi Aero Opita)	8 Jun 74	44	D	Cerro El Retiro, Colombia. Separation of left tailplane (spar). Ref: ICAO AAD No. 20, 1977, p. 134.
B26	Fokker DR-1	14 Jul 74	0	S	Tehachapi, Cal. USA. Rudder post failed above upper hinge. Rudder folded to horizontal position. NTSB file 3-1871
B27	Cessna A188B	25 Jul 74	0	S	Fairfax, S.C. USA. Right horizontal stabilizer rear spar and channel assembly. NTSB file 3-4350.
B28	Boeing 707 321C (Dan-Air)	14 May 77	6	D	Lusaka, Zambia. Separation of right horizontal stabilizer & elevator. Stabilizer rear top chord. Airframe hours: 47,621. Ref: UK Aircraft Accid. Rept. 9/78, 8 Feb. 79.
B29	Piper PA-23 Aztec	27 Sep 77	0	S	Morris, Ill. USA. Rudder attachment. Sequin Aviation rudder STC SA671SW failed. Ref: NTSB file 3-4158.
B30	Maule M-4-210C	30 Apr 78	1	S	Bethel, Alaska USA. Left horizontal stabilizer. NTSB file 3-3595.
B31	Canadair CL-41 Tutor (Canadian Forces)	3 May 78	1	D	Grande Prairie, Alta. Canada. Horizontal stabilizer separated. Crack at corner in stabilizer rear attachment fitting. Snowbird aerobatic team. Matl: 7075-T6. Ref: CF ACAIRS

TAIL FAILURE (FIXED-WING)

B32 Piper PA-12 Super Cruiser	4 May 78	0	S Rheine-Eschendorf, W. Germany. Horizontal stabilizer, front spar attachment. Ref: W. German file 3X0088.
B33 Cessna 150	9 Oct 78	0	S Hamilton, Ont. Canada. Horizontal stabilizer, attachments. 5901 airframe hours. Ref: MOT Canada file 080088.
B34 Piper PA-32 Cherokee Six	1979	2	D Marulan, NSW Australia. Right-hand stabilator failed. Ref: Australia
B35 Luscombe 8A	28 Oct 79	0	D Fredericksburg, Texas USA. Vertical stabilizer & rudder separated (attachment failure). NTSB file 3-3331.
B36 D.H. DHC-2 Mk.1 Beaver	6 Dec 79	1	D Captain's Flat, NSW, Australia. Vertical stabilizer separated (mounting bracket). Attach fitting damaged in prior acc ident. Role: agricultural. Ref: Australia DoT
B37 Bellanca 8	1981	0	S Archerfield, Qld. Australia. Two elevator ribs failed. Aircraft landed safely. Ref: Australia DoT.

Total Fatalities: 244

* APPENDIX C *
* *
* FIXED-WING AIRCRAFT - FUSELAGE *

ID No.	Aircraft Type	Accident Date	No. a Dead m	D	Remarks
C1	Lockheed T-33 Silver Star (USAF)	1953-59	? ? ?		Fuselage failure. Ref: J.D. Caldara, p 28 in WADC TR 59-507, 1959
C2	Boeing B-47 Stratojet (USAF)	1953-59	? ? ?		Fuselage failure. Ref: J.D. Caldara, p 25 in WADC TR 59-507, 1959
C3	Martin B-57 (USAF)	1953-59	? ? ?		Fuselage failure. Ref: J.D. Caldara, p 25 in WADC TR 59-507, 1959
C4	Republic F-84 Thunderstreak (USAF)	1953-59	? ? ?		Fuselage failure. Ref: J.D. Caldara, p 20 in WADC TR 59-507, 1959.
C5	N. American F-86 Sabre (USAF)	1953-59	? ? ?		Fuselage failure. Ref: J.D. Caldara, p 20 in WADC TR 59-507, 1959.
C6	D.H. Comet 1 (BOAC)	10 Jan 54	35	D	Mediterranean Sea off Elba, Italy. Fuselage fatigue failure, origin: ADF window. Ref: ICAO AAD No. 6, 1956, p. 16.
C7	D.H. Comet 1 (BOAC on charter to SAA)	8 Apr 54	21	D	Mediterranean Sea off Naples, Italy. Fuselage fatigue failure, origin: ADF window. Ref: ICAO AAD No. 6, 1956, p. 16.
C8	Douglas DC-7 (Delta)	18 Jan 57	0	S	New Orleans, La. USA. Mild explosive decompression. Fuselage cracks in area of forward crew entrance & cargo doors Ref: WAAS p 1/57.
C9	Lockheed Constellation	1958	0	S ?	Aft pressure bulkhead. Crack propagated completely around circumference of bulkhead. Origin: corrosion in toilet area. 37,000 hours. Ref: J.K. Williams, p 108 in Gassner & Schutz, FATIGUE DESIGN PROCEDURES, 1969.
C10	Boeing B-52 Strato- fortress (USAF)	19 Jan 61	8?	D	Monticello, Utah USA. Aft fuselage just forward of vertical stabilizer. Role: low altitude. Ref: AWST May 13/ 63, p 26, & FI 5 Sept. 63 p. 414

FUSELAGE (FIXED-WING)

- C11 Boeing B-52 24 Jan 63 8? D Little Shanty Mountain, Maine USA.
 Strato-fortress
 (USAF) Aft fuselage just forward of vertical stabilizer. Role: low altitude. Ref: AWST May 13/63, p 26, & FI 5 Sept. 63 p. 414
- C12 Boeing B-52 30 Jan 63 8? D Mora, New Mexico USA.
 Strato-fortress
 (USAF) Aft fuselage just forward of vertical stabilizer. Role: low altitude. Ref: AWST May 13/63, p 26, & FI 5 Sept. 63 p. 414
- C13 Republic F-105B 9 May 64 1 D Hamilton Air Force Base, USA.
 Thunderchief
 (USAF) Aircraft broke in two. Fuselage failure at tank cover, FS 350. Airframe hours: 600. Material: 7075-T6. Role: Thunderbird demo team. Ref: AWST May 18/64 p 38, & Dec. 14/64 p. 18; Merkin, AFFDL TR 70-144, p 799.
- C14 Cessna 210 5 Jul 64 0 S Richmond, Va. USA.
 Fuselage bulkhead assembly failed. Gear collapsed. Ref: NTSB file 3-1942.
- C15 Republic F-105D-4 6 June 65 1? D USA?
 Thunderchief
 (USAF) Fuselage failure at splice at fuselage tank cover, FS 350. Material: 7075-T6. Ref: Merkin, AFFDL TR 70-144, p 799, & AGARD CP-118, p. 54.
- C16 Piper PA-25 20 Aug 65 0 S Newellton, La. USA.
 Pawnee Both upper fuselage longerons failed (poor weld). Ref: NTSB file 3-3516.
- C17 Beechcraft C-45H 12 Nov 65 0 S San Juan, P.R. USA.
 Right & left flanges of bulkhead cracked, allowing nose gear drag leg to retract. Ref: NTSB file 3-3340.
- C18 Lockheed C-130 15 Apr 66 0 D Borden, Sask. Canada.
 Hercules
 (Canadian Forces) Explosive decompression of fuselage. Forward cargo door missing. Failure of #1 eye bolt. Origin: stress concentration (poor machining). Ref: CFAIRS.
- C19 Douglas DC-6B 24 Feb 67 0 S North Holmdel, N.J. USA.
 (Northeast) Fuselage: skin and attachments, 60" x 125" hole torn aft crew compartment door. 37,264 airframe hours. Ref: NTSB file 1-0021
- C20 Boeing 707-349C 24 Sep 70 0 S Enroute Shannon/London Loss of pressurization, fatigue of portion of external main cargo door skin. Ref: Ireland.
- C21 Vickers 951 Vanguard (BEA) 2 Oct 71 63 D Aarsle, Belgium.
 Rear bulkhead failure, causing separation of both tailplanes. Initiated by stress corrosion. Ref: Belgium AA.

C-3
FUSELAGE (FIXED-WING)

- C22 N. American 23 Feb 77 0 S Ft. McMurray, Alta. Canada.
Commander
681B Co-pilot's window shattered. Crazing on outer
surface. Subsequent pressurization cycles
caused fatigue rupture. 1769 airframe hours.
Ref: MOT Canada file W70015
- C23 Grumman G-44 30 Dec 78 0 S Waitemata, New Zealand.
Widgeon Section of hull plating immediately forward of
the step failed. Fatigue & stress corrosion.
Ref: ICAO ADREP 493/78.
- C24 Douglas 17 Sep 79 0 S Between Boston USA & Yarmouth NS, Canada.
DC-9-32 Fatigue fracture of aft cabin pressure bulkhead
(Air Canada) (explosive decompression). Origin: rivet hole
below aft bulkhead access door. Crack missed in
prior inspections. 28,425 airframe hrs, 26,816
landings. Matl: Alclad 2014-T6. Ref: NTSB AAR-
80-13.
- C25 Lockheed 18 Jan 80 0 S Syracuse, N.Y. USA.
L-188 Electra Forward cargo door separated. Door latch loop
(Zantop) (fastener holes). 37,794 airframe hours,
16,469 landings. NTSB file 1-0008.

Total Fatalities: 145

* APPENDIX D *
*
* FIXED-WING AIRCRAFT - FLIGHT CONTROLS *

ID No.	Aircraft Type	Accident Date	No. Dead	Remarks
D1	Latecoere 631	28 Mar 50	12	D Cape Ferrett, France. Aileron control couplings, port wing. Ref: ICAO AAD No. 3, 1953, p 7; "HISTOIRE DE L'AERONAUTIQUE FRANCAIS - L'EPEPEE 1940-60", p. 108.
D2	Avro CF-100 Canuck (Canadian Forces)	21 Apr 54	2	D North Bay, Ont. Canada. Outboard hinge bracket of starboard flap. Ref: CF ACAIRS
D3	Avro CF-100 Canuck (Canadian Forces)	19 Jun 56	2	D Bagotville, Que. Canada. Outboard hinge bracket of starboard flap. Flap separated. Ref: CFAIRS.
D4	Vickers Viscount 701 (BEAC)	14 Mar 57	20	D Manchester, England. Bolt failure, starboard no. 2 flap attachment. Ref: ICAO AAD No. 9, 1959, p. 76
D5	PZL-102 Kos	13 May 62	2	D Joensuu Airport, Finland. Supporting bracket of pedal. Ref: Finland BoA.
D6	Piper PA-18 Super Cub	31 Jan 64	0	S Lewiston, Id. USA. Rudder cable attachment fitting lug. Ref: NTSB file 3-0386.
D7	Cessna 170	4 Oct 64	0	S Effingham, Ill. USA. Left rudder cable. Ref: NTSB file 3-3106
D8	Luscombe 8A	16 Jan 65	0	S Colliston, Utah. USA. Left rudder cable. Ref: NTSB file 3-0234.
D9	Piper PA-25 Pawnee	2 Jun 65	1	D Clarendon, Ark. USA. Fracture in elevator tab control system. Role: aerial application. NTSB file 2-0582
D10	N. American SNJ-5 Texan	14 Aug 65	0	S Monroeville, Pa. USA. Left rudder cable. Ref: NTSB file 3-2237
D11	Cessna 172G	26 Dec 65	0	S Streator, Ill. USA. Left aileron push-pull rod. NTSB file 3-4008.
D12	Beech C-45H	3 Mar 67	0	S Janesville, Wis. USA. Fabric separation at elevator trim tab hinge and elevator-horizontal stabilizer hinge areas. Ref: NTSB file 3-0556.

D-2

FLIGHT CONTROLS (FIXED-WING)

- D13 Vickers 9 Aug 67 0 S New York, N.Y. USA.
Super VC.10
(BOAC) Section of starboard flap separated (broken lug on flap trolley). Ref: WAAS p. 17/67.
- D14 CallAir A-9 16 Aug 67 1 D Knobel, Arkansas USA.
Fracture of right rudder cable, which was chafing against off-centre fairlead. Role: aerial application. NTSB file 2-0528
- D15 General 28 Mar 68 2 D Thailand.
Dynamics Failure in lock weld on rod end in control
F-111A valve assembly controlling hydraulic actuators
(USAF) of tailplane. Aircraft not recovered. Ref: FI
20 June 68 pp 934-935 & 4 Apr/68 p 498.
- D16 General 30 Mar 68 0 D Thailand.
Dynamics Failure in lock weld on rod end in control
F-111A valve assembly controlling hydraulic actuators
(USAF) of tailplane. Aircraft not recovered. Ref: FI
20 June 68 pp 934-935 & 4 Apr/68 p 498.
- D17 General 22 Apr 68 2 D Thailand.
Dynamics Failure in lock weld on rod end in control
F-111A valve assembly controlling hydraulic actuators
(USAF) of tailplane. Aircraft not recovered. Ref: FI
20 June 68 pp. 934-935 & 2 May 68 p. 655.
- D18 General 8 May 68 0 D Nevada, USA.
Dynamics Failure in lock weld on rod end in control
F-111A valve assembly controlling hydraulic actuators
(USAF) of tailplane. Ref: FI 20 June 68 pp. 934-935.
- D19 Ambassador 3 Jul 68 6 D Heathrow Airport, London England.
AS.57 Series 2 Failure of port flap operating rod,
(B.K.S. Air permitting flap to retract. Ref: ICAO AAD
Transport) No. 18 Vol. II, p. 121
- D20 Boeing 707 26 Jul 69 5 D Pomona, N.J. USA.
(Trans World) Hydraulic system, port outboard spoiler down-line. Loss of fluid in control system for rudder & rudder tab caused loss of directional control. Role: training. Ref: NTSB file 1-0017
- D21 Cessna 172 17 Jan 71 0 S Claypool, Ind. USA.
Right aileron push-pull rod assembly broken.
Ref: NTSB file 3-0534.
- D22 Avro CF-100 3 Mar 72 0 D Mt. Tremblant Park, Que. Canada.
Canuck Aileron trimmer tab fitting failed (fatigue and
(Canadian Forces) stress corrosion). Ref: CFAIRS.
- D23 Hawker 23 Jan 74 1 D Wildenrath, West Germany.
Siddley Harrier Starboard flap mechanical drive system.
GR.3 (Royal AF) Ref: RAF.

- | | | | | |
|-----|--|-----------|---|---|
| D24 | Hirth
Acrostar Mk 2 | 4 Jul 74 | 1 | D Straubing-Wallm. West Germany.
Failure of control system. Unapproved modification. Ref: West German file 3X0298. |
| D25 | Ercoupe | 22 Mar 75 | 1 | D Fulton, Mo. USA.
Right aileron push-pull control rod broken.
Ref: NTSB file 3-0603 |
| D26 | Boeing
747-136
(British Airways) | 16 May 75 | 0 | ? Prestwick, Scotland.
Right inboard wing trailing edge foreflap detached. Crack in outboard sequence carriage attachment fitting at horiz flange. Ref: WAAS p. 10/75; & UK AIB AAR 13/76. |
| D27 | Scheibe
SF-26A sailplane | 25 May 75 | 0 | D Perris, Ca. USA.
Right aileron bellcrank. Ref: NTSB file 3-2575 |
| D28 | Cessna 320B | 6 Jun 75 | 0 | S Bowling Green, Ky. USA.
Elevator push-pull rod attach rivets. Ref: NTSB file 3-1657. |
| D29 | Grumman
AA-1B | 31 Jul 75 | 0 | S St. Andrews, Man., Canada.
Left rudder centering spring. Ref: MoT Canada file C50104. |
| D30 | UTVA Weihe | 11 Jul 76 | 0 | S Alte Ems, W. Germany.
Left hand rudder cable. Ref: W. German file 3X0333. |
| D31 | Cessna 172 | 3 Jun 77 | 0 | S Basking Ridge, N.J. USA.
Flap switch, down to neutral position spring broken. Ref: NTSB file 3-1456. |
| D32 | Ercoupe | 15 Jun 77 | 2 | D New Bedford, Mass. USA
Left horizontal member of the T-control yoke (weld). Hydrogen embrittlement & fatigue.
Ref: NTSB file 3-1280 |
| D33 | Schleicher
K 8 | 10 Jul 77 | 0 | D Guetersloh, W. Germany.
Elevator control rod. Ref: W. German file 3X0309. |
| D34 | Cessna
337
Super Skymaster | 30 Sep 77 | 0 | S Kingston, Ont. Canada.
Upper rod, between bellcrank and elevator balance weight arm (threads). Ref: MoT Canada file 070909. |
| D35 | Scheibe
Zugvogel III-B | 10 Sep 78 | 0 | S Kreuzberg-Kronach, W. Germany.
Right spoiler drive. Ref: W. German file 3X0411 |
| D36 | Boeing
747SR-100
(JAL) | 11 Nov 78 | 0 | S Osaka, Japan.
Flap track bolts of right outer trailing edge flap. Ref: Japan MoT. |

FLIGHT CONTROLS (FIXED-WING)

- D37 Pietenpol B4 8 Jul 79 1 D Mesa, Arizona USA.
Aircamper
Elevator push-pull bellcrank mounting steel tube. NTSB file 3-2126
- D38 Grumman 17 Sep 79 1 S Avalon, Calif. USA.
G-21A Goose
Up elevator cable separated 3 to 4 ft. forward of station 29. NTSB file 3-3075
- D39 RLU Breezy 22 Sep 79 2 D Frazer, Mi. USA.
RLU-1
Lower weld in aileron cable pulley bracket. (Weld surface heavily oxidized.) Ref: NTSB file 3-2408.
- D40 Piper PA-25 1980 0 D Sassafras, Tas. Australia.
Pawnee
Up-elevator cable rear turnbuckle failed. Non-corrosive resistant bolt fitted & overtightened. Ref: Australia DoT.
- D41 McDonnell 13 Jan 80 0 S Gander, Nfld., Canada.
Douglas
DC-8-61
Left flap support fitting at station XF219.498 fractured, and 2 flap hinge base fittings at station XW97.906 fractured. Ref: Jamaica.
- D42 Glasfluegel 1 May 80 0 S Tauberbischofsh., W. Germany.
Standard
Libelle
Elevator drive in region of stick. Ref: W. German file 3X0094.
- D43 Pitts S-1S 4 May 80 1 D Fort Wayne, In. USA.
Elevator push-pull tube at rod end bearing (lack of lubrication). NTSB file 3-3018.
- D44 Lockheed 27 Aug 80 0 D Terschelling Is., Netherlands.
CF-104 Starfighter
(Canadian Forces)
Left leading-edge flap separated. Failure of forward beam hinge lobes. Ref: CFAIRS.
- D45 Hawker 14 Oct 80 1 D Guttersloh, W. Germany
Siddley
Harrier GR.3
(Royal AF)
Failure of roll reaction control rod from starboard aileron to roll reaction shutter. Ref: FI 25 July 81, p. 221.
- D46 Maule M5 1981 0 S Bankstown NSW, Australia.
Right rudder-pedal torque tube (weld). Ref: Australia DoT.
- D47 Varga 2150A 31 Jul 81 2 D Stevensville, Md. USA.
Kachina
Elevator horn failed. Ref: NTSB file 3-2084.
- D48 Hirth 19 Sep 82 0 D Pau, France.
Acrostar
Tube in which (elevator) stick is mounted was broken on one side. Ref: FI 11 Dec. 82 p 1671.

Total fatalities: 68

E-1
ENGINE/TRANSMISSION (FIXED-WING)

 * APPENDIX E *
 * *
 * FIXED-WING AIRCRAFT - ENGINE OR TRANSMISSION *

ID No.	Aircraft Type	Accident Date	No. Dead	D m	Remarks
E1	Handley Page W.10 (Imperial Airways)	17 Jun 29	7	D	English Channel near Dungeness, England. Steel studs in front big-end bearing of starboard engine. Ref: IRON AGE, 5 Sept/29, p 600; The Aeroplane, 19 Jun 29, p 1008.
E2	Douglas DC-3 (Viking Air Transport)	16 May 46	27	D	Richmond, Va. USA. Crack in no. 6 cylinder of left engine. Ref: WAAS p 3/44 & Aviation News, 10 March/49 p 20.
E3	Douglas DC-3 (Trans-Luxury Airlines)	21 Aug 46	2	D	Moline, Ill. USA. No. 5 cylinder fractured at barrel between fins & flange. Ref: Aviation News 16 Dec/46 p 14 & 2 Sept. 46 p 17
E4	Lockheed L-049 Constellation (Pan American)	18 Jun 47	14	D	Mayadine, Syria. No. 18 exhaust rocker arm of no. 1 engine. Ref: AW July 12/48 p. 48, & WAAS p 11/47.
E5	Douglas Dakota (BEA)	30 Jul 48	0	D	Sywell, UK. Malfunction of starboard engine, constant speed unit due to fatigue failure of filter gauze. Ref: WAAS p. 16/48.
E6	Curtiss C-46F (Miami Airline)	16 Dec 51	56	D	Newark, N.J. USA. Hold-down studs of no. 10 cylinder, right engine. Ref: ICAO AAD No. 3, 1953, p. 84
E7	Douglas DC-3 (Sabena)	4 Feb 52	16	D	Kitwit, Belgian Congo. No. 6 piston lug failed, shearing off propeller. Ref: Belgium AA.
E8	Handley Page Hermes IV (Airwork)	23 Jul 52	0	D	Pithiviers, France. Crankshaft web. Ref: Barnes, HANDLEY PAGE AIRCRAFT SINCE 1909, pp 469-470.
E9	Handley Page Hermes IV (Airwork)	25 Aug 52	7	D	Trapani, Sicily. Crankshaft web. Ref: Barnes, HANDLEY PAGE AIRCRAFT SINCE 1909, p 470.
E10	Avro CF-100 Canuck (Canadian Forces)	11 Aug 53	2	D	St-Hubert, Que. Canada. Failure of a Banjo bolt fitting in fuel system of starboard engine caused double flameout. Ref: CF ACAIRS

E-2 ENGINE/TRANSMISSION (FIXED-WING)

- | | | | | | |
|-----|---|-----------|----|---|--|
| E11 | Convair 240
(American Airlines) | 4 Aug 55 | 11 | D | Fort Leonard Wood, Missouri, USA.
Crack in cylinder wall of engine, causing fire & separation of wing. Unairworthy cylinder installed. Ref: ICAO AAD No. 7, 1957, p 160. |
| E12 | Douglas DC-7C
(SAS) | 29 Oct 57 | 0 | S | Off US coast, NY/Copenhagen.
No. 1 engine impeller drive gear. Ref: WAAS p 20/57. |
| E13 | Curtiss C-46F
(Aerovias Sud Americana) | 6 Nov 57 | 2 | D | Guatemala City, Guatemala.
Crankshaft of port engine. Ref: ICAO AAD No. 9, 1959, p. 219. |
| E14 | Douglas DC-7C
(Braniff) | 25 Mar 58 | 9 | D | Miami Fla. USA.
No. 11 cylinder of no. 3 engine (above mounting flange). AW Feb. 9/59 pp 103-123. |
| E15 | Miles M.65 Gemini | 4 Mar 59 | 1 | D | Panshanger Aerodrome, Hertford U.K.
Crankshaft of starboard engine. Ref: Ministry of Aviation C.A.P 171, 1961. |
| E16 | Cessna T-50 | 4 Apr 59 | 0 | S | Kasigluk, Alaska, USA.
Crankshaft, next to rear side of propeller thrust nut. Ref: USACAD. |
| E17 | Helio H-395 Super Courier | 16 Sep 59 | 0 | S | McMurray, Alta. Canada.
Connecting rod bearing cap retaining bolt. Ref: MoT Canada file 777. |
| E18 | Curtiss C-46
(Pacific Western) | 29 Jan 60 | 0 | D | Port Hardy, B.C. Canada.
Reduction drive ring gear in right engine. Ref: WAAS p 3/60. |
| E19 | Curtiss C-46A
(Lineas Aereas de Nicaragua) | 5 Apr 60 | 2 | D | Siuna Aerodrome, Nicaragua.
Port engine failed due to fatigue of distributor valve of port propeller. Ref: ICAO Circular 64-AN/58, 1963, p. 156. |
| E20 | Helio H-391B Courier | 19 May 60 | 0 | S | Watson Lake, Y.T. Canada.
Movement between stationary gear plate and reduction gear housing permitted severe engine vibration and fatigue failure of bolts. Ref: MoT Canada file 970. |
| E21 | Douglas DC-3
(Ozark) | 6 Sep 60 | 0 | S | Des Moines, Iowa, USA.
No. 10 cylinder exhaust insert mounting of right engine. Ref: USACAD. |
| E22 | de Havilland DHC-3 Otter | 16 Sep 60 | 0 | S | Frobisher Bay, NWT. Canada.
Crankshaft at mating splines between front and rear halves. Ref: MoT Canada file 1116. |
| E23 | Curtiss C-46F
(Capitol Airlines) | 22 Jan 61 | 2 | D | Katy, Texas, USA.
No. 8 cylinder hold-down studs. Uncontrollable fire and separation of wing. Ref: WAAS p. 1/61 |

E-3
ENGINE/TRANSMISSION (FIXED-WING)

E24 Curtiss C-46F	28 Aug 61	0	S Fairbanks, Alaska. USA. Holdown studs, no. 8 cylinder, left engine. Ref: WAAS p. 18/61.
E25 Fleet 80 Canuck	9 Oct 61	0	S Trinity Bay, Que. Canada. Left-rear cylinder hold down studs. Ref: MoT Canada file 1503.
E26 Boeing 720 (United)	1 Feb 62	0	S Portland, Ore. USA. Third stage compressor blades. Origin: trailing edge corner of dovetail on convex side of blade Ref: WAAS p. 3/62.
E27 Douglas Dakota (Darbhanga)	24 May 62	4	D Rajshani, E. Pakistan. Port engine. Ref: WAAS p. 13/62.
E28 Cessna 195	14 Jun 62	0	D Kaouk River, B.C. Canada. Crankshaft. Ref: MoT Canada file 1698.
E29 de Havilland Comet 4 (BOAC)	11 Oct 62	0	S London, UK. 'O' stage compressor blade, no. 3 engine. Ref: WAAS p. 26/62.
E30 Turbulent	26 May 63	0	D Guildford, UK. Crankshaft. Ref: FI 2 Jan 64 p 32
E31 Stinson 108	26 Jan 64	0	S Hammond, La. USA. No. 5 cylinder at barrel casting. Ref: NTSB file 3-0391.
E32 Meyers 200B	17 Feb 64	0	S Cleveland, Ohio. USA. No. 5 cylinder. Ref: NTSB file 3-0379.
E33 Cessna 182	6 Mar 64	0	D Sedalia, Mo. USA. Master & connecting rods. Ref: NTSB file 3-0605
E34 de Havilland DHC-1 Chipmunk	26 Apr 64	0	S Orillia, Ont. Canada. Crankshaft at tapered propeller end. Caused prop separation. Ref: MoT Canada file 2295.
E35 Beech C50 Twin Bonanza	14 May 64	0	S Concord, N.H. USA. High pressure fuel line. NTSB file 3-1280
E36 Bellanca 14-13	14 Jul 64	0	S North Creek, N.Y. USA. Crankshaft. Ref: NTSB file 3-2073.
E37 Cessna 182A	25 Jul 64	2	D Juneau, Alaska, USA. Master & connecting rods. Ref: NTSB file 2-0586
E38 Douglas DC-3	19 Aug 64	0	D Tonopah, Nevada, USA. Fractures of right engine no. 12 cylinder, and left engine front master rod bearing. Ref: WAAS p. 18/64

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ENGINE/TRANSMISSION (FIXED-WING)

- E39 Boeing 75N1 19 Sep 64 0 S Lepanto, Ark. USA.
Stearman Crankshaft, next to front thrust bearing. Ref:
NTSB file 3-2949.
- E40 Piper PA-22 31 Oct 64 0 D Hanover, Ont. Canada.
Crankshaft bearing failure caused fatigue crack
in crank throw. Ref: MoT Canada file 2415.
- E41 Navion B 27 Jan 65 0 S Flushing, N.Y. USA.
No. 4 bearing cap bolt. Ref: NTSB file 2-0037.
- E42 Cessna 175 6 Feb 65 0 S Brawley, Cal. USA.
Crankshaft. Ref: NTSB file 3-3872.
- E43 Navion B 7 Mar 65 0 S Englewood, Fla. USA.
Heater muffler at exhaust stack attachment.
Ref: NTSB file 3-0460.
- E44 Boeing
PT-13
Stearman 15 Mar 65 0 S Legrand, Cal. USA.
Crankshaft at thread area of thrust bearing
nut. Ref: NTSB file 3-0398.
- E45 Globe
GC-1B 27 Mar 65 0 S New Carlisle, Ohio. USA.
No. 2 piston. Ref: NTSB file 3-0759.
- E46 Navion A 1 Apr 65 0 D Coon Rapids, Minn. USA.
No. 1 piston. Ref: NTSB file 3-1225.
- E47 Cessna
140 14 Apr 65 0 S Tulsa, Okla. USA.
No. 2 cylinder. Ref: NTSB file 3-1180.
- E48 Luscombe 8C 18 Apr 65 0 D Laguna Beach, Calif. USA.
Engine crankshaft. Ref: NTSB file 3-0773.
- E49 Piper PA-18
Super Cub 24 Apr 65 1 D Dell, Montana USA.
Fracture in muffler obstructed exhaust gas
flow. Backpressure caused power failure. Ref:
NTSB file 2-0325.
- E50 Boeing
720B
(Continental) 3 May 65 0 S Los Angeles, Cal. USA.
No. 2 engine 2nd stage fan disc (spacer hole).
Ref: NTSB file 1-0052.
- E51 Piper
PA-22 13 May 65 0 S Jeffersonville, Ind. USA.
Crankshaft flange. Ref: NTSB file 3-1286.
- E52 Grumman G-164 AgCat 8 Jun 65 0 S Tallulah, La. USA.
No. 4 cylinder connecting rod. NTSB file 3-1405.
- E53 Cessna
TL-19D 15 Jun 65 0 S Almyra, Ark. USA.
Fuel mixture control arm. Ref: NTSB file 3-3736
- E54 Aero
Commander 680 21 Jun 65 0 S Cleveland, Ohio. USA.
No. 4 cylinder. Ref: NTSB file 3-1459.

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ENGINE/TRANSMISSION (FIXED-WING)

E55	Stinson 108-2	24 Jun 65	0	D Kenosha, Wis. USA. No. 4 cylinder exhaust valve. NTSB file 3-2096.
E56	Lockheed CF-104 Starfighter (Canadian Forces)	5 Jul 65	0	D Zweibrucken, Germany. Main fuel pump drive splines (lack of lubrication). Ref: CFAIRS.
E57	Cessna 210E	19 Jul 65	0	S McCracken, Kans. USA. No. 3 cylinder connecting rod. NTSB file 3-3275.
E58	Aeronca 7AC Champion	10 Aug 65	0	S Warrington, Pa. USA. No. 2 cylinder exhaust valve. NTSB file 2-0443.
E59	Curtiss C-46A (Paranese Transport Aereos)	12 Aug 65	13	D Barra do Bugres, Brazil. Bolts of no. 8 cylinder, left engine. Engine fire caused wing separation. Ref: ICAO AAD No. 17 Vol. 1, p. 171.
E60	Stinson 108-2	4 Sep 65	0	S Oak Hill, W.Va. USA. No. 6 cylinder exhaust valve. NTSB file 3-2628
E61	Piper PA-22	6 Sep 65	0	S Clermont, Ind. USA. Muffler (baffle failed). Ref: NTSB file 3-2770
E62	Cessna 180B	27 Sep 65	1	D Lake Corneau, Que. Canada. No. 2 piston. Ref: MoT Canada file 2735.
E63	Beechcraft C-45H	11 Oct 65	0	S Kauai, Hawaii. USA. Fuel line to carburettor at fitting to carb. Ref: NTSB file 3-3115.
E64	Beech 35 Bonanza	12 Oct 65	0	S Carlsbad, Cal. USA. Magneto switch. Ref: NTSB file 3-2969.
E65	Cessna 170B	13 Oct 65	0	S Silverdale, Wash. USA. Valve assemblies fatigue fracture. Exhaust valve burned, spark plugs excessively worn. Ref: NTSB file 3-3680.
E66	Piper PA-24 Commanche	4 Nov 65	0	S Homer, Ga. USA. No. 3 cylinder connecting rod cap bolts. Ref: NTSB file 3-3998.
E67	Piper PA-24 Commanche	5 Nov 65	0	S Red Bluff, Cal. USA. Generator brushes. Ref: NTSB file 3-3262.
E68	Cessna 182B	29 Nov 65	0	S Mokelumne Park, Cal. USA. Crankshaft gear. Ref: NTSB file 3-3522.
E69	Piper PA-22	1 Dec 65	0	D Beaufort, S.C. USA. Exhaust muffler inlet pipe. Ref: NTSB file 3-3570.
E70	Cessna 182	10 Dec 65	0	S Hot Springs, Ark. USA. No. 6 cylinder exhaust valve. NTSB file 3-3763.

ENGINE/TRANSMISSION (FIXED-WING)

E71	Piper PA-24 Commander	15 Jan 66	0	S	Montgomery, La. USA. No. 1 cylinder exhaust valve. NTSB file 3-0044.
E72	Cessna 150F	22 Jan 66	0	S	West Los Angeles, Cal. USA. No. 1 connecting rod. Ref: NTSB file 3-0243.
E73	Piper J-3C	25 Jan 66	0	S	Chesapeake, Va. USA. No. 2 cylinder exhaust valve. NTSB file 3-0125.
E74	Vickers Viscount (Air Inter)	6 Feb 66	0	S	Lyons/Paris, France. Annulus gear in reduction section of #1 engine. Ref: WAAS p. 4/66.
E75	Boeing 720 (Braniff)	13 Feb 66	0	S	Dallas, Tex. USA. Turbine spacer, wheel. Ref: NTSB file 1-0007.
E76	Piper PA-22	24 Feb 66	0	S	Hamburg, N.Y. USA. Exhaust pipe cracked. Ref: NTSB file 3-0698.
E77	Cessna 185C	26 Feb 66	0	S	Morgan City, La. USA. Crankshaft at propeller mounting flange. Ref: NTSB file 3-0383.
E78	Grumman G-44 Widgeon	15 Mar 66	0	S	Port Alberni, B.C. Canada. Crankshaft at grinding crack in cheek of fillet of no. 4 bearing journal. MoT Canada file 2864.
E79	Beech 35 Bonanza	10 Apr 66	0	S	Texico, N.Mex. USA. Carburetor alternate air door hinge. Ref: NTSB file 3-0904.
E80	Grumman G-164 AgCat	20 Apr 66	0	S	Butte City, Cal. USA. Wrist pin and link rod, no. 1 cylinder. Ref: NTSB file 3-0860.
E81	Luscombe 8E	15 May 66	0	S	Eau Gallie, Fla. USA. Crankshaft cluster gear attaching screws. Ref: NTSB file 3-2465.
E82	de Havilland DHC-3 Otter	16 Jun 66	0	S	Pocketknife Creek, B.C. Canada. Bushing in no. 2 cylinder exhaust rocker box casting. Ref: MoT Canada file 2983.
E83	Cessna 172	3 Jul 66	0	S	Huntsville, Ont. Canada. No. 1 cylinder barrel between 6th and 7th cooling fins. Ref: MoT Canada file 3003.
E84	Cessna 310	10 Jul 66	2	D	Longmont, Colo. USA. Fracture at poor weld in exhaust, caused fuel fire & separation of right wing. NTSB file 2-0572.
E85	Boeing IB75A Stearman	23 Jul 66	1	D	Valparaiso, Ind. USA. Crankshaft. Prop shaft separated at thrust nut threads, prop hit wing brace & wing folded. Role: aerobatics. NTSB file 2-0629

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ENGINE/TRANSMISSION (FIXED-WING)

E86 Taylorcraft BC-65	2 Aug 66	0	S Midland, Mich. USA. Throttle shaft separated from carburetor throttle arm. Ref: NTSB file 3-2410.
E87 Cessna 140A	25 Aug 66	0	S Sikes, La. USA. No. 3 cylinder exhaust valve. NTSB file 3-2286.
E88 Navion A	8 Sep 66	0	S Phillipstown, N.Y. USA. Crankshaft accessory drive gear dowel pin and attach screws failed. Ref: NTSB file 3-2623.
E89 Douglas DC-4 (Avianca)	22 Sep 66	2	D Bogota, Colombia. Failure of a number of teeth of pinion of governor control unit, causing engine overspeed. Ref: WAAS p. 27/66.
E90 Vickers Viscount 724 (Air Canada)	17 Dec 66	0	S Edmonton, Alta. Canada. 1st stage impeller, no. 3 engine compressor. Ref: MoT Canada file 3227.
E91 Aero Commander 560E	21 Feb 67	4	D Tahoe Valley, Calif. USA. Impulse coupling cam assembly on magnetos. Ref: NTSB file 2-1083.
E92 Luscombe 8E	23 Apr 67	0	D Laguna Beach, Calif. USA. Camshaft rear bearing journal in area of flange fillet. Ref: NTSB file 3-1283.
E93 Saab-Scania S35E Draken (Swedish AF)	10 May 67	0	D Soderkoping, Sweden. Compressor blade. Ref: Swedish AF
E94 CallAir A-9	8 Jun 67	0	D Belvidere, S. Dakota USA. Outlet connector at fuel selector failed. Role: Crop spraying. Ref: NTSB file 3-2055.
E95 Navion B	18 Jun 67	0	S Stoney Plain, Alta. Canada. Studs attaching stationary gear drive plate to interior of reduction gear housing. Ref: MoT Canada file 3441.
E96 Helio 395A Super Courier	30 Jul 67	0	? Cullaton Lake, NWT. Canada. No. 4 cylinder exhaust valve. Ref: MoT Canada file 3539.
E97 Aeronca 7AC Champion	15 Aug 67	0	S Commerce, Tex. USA. Loose prop retainer nut caused cracking of crankshaft. Ref: NTSB file 3-2928.
E98 Republic RC-3 Seabee	20 Oct 67	0	S Goleta, Cal. USA. Mixture control cable bracket. NTSB file 3-3688.
E99 Beech E18S	8 Jan 68	3	D San Diego, Calif. USA. Cracked shroud, 3rd stage stator assembly. Ref: NTSB file 3-4633

ENGINE/TRANSMISSION (FIXED-WING)

E100	Piper PA-28 Cherokee	14 Jan 68	0	S Hazelhurst, Ga. USA. No. 2 connecting rod. Ref: NTSB file 3-0045.
E101	Cessna 150F	7 Mar 68	0	S Findo-Gask, Perthshire, UK. Engine cylinder. Ref: UK BoT C.A.P. 327 p 27.
E102	Boeing 707-465 (BOAC)	8 Apr 68	5	D Heathrow Airport, London England. No. 5 low pressure compressor wheel. Ref: ICAO AAD No. 18 vol. II, 1971, p. 79.
E103	Piper J-4	5 May 68	0	S Berlin, N.J. USA. Crankshaft failed in keyway. NTSB file 3-1380.
E104	Piper PA-22	23 Jun 68	0	S Lac Baron, Que. Canada. Bolt of no. 2 connecting rod. Ref: MoT Canada file 3942.
E105	Piper PA-25 Pawnee	5 Jul 68	0	S Bosco, La. USA. Left magneto shaft. NTSB file 3-1747.
E106	Piper PA-25 Pawnee	25 Aug 68	0	S David City, Neb. USA. Mixture control wire failed in bend radius. Ref: NTSB file 3-2809.
E107	Grumman G-164A AgCat	16 Sep 68	0	S Ferriday, La. USA. No. 9 cylinder head. Ref: NTSB file 3-3295.
E108	Cooney R-1 Tomcat	24 Sep 68	0	S Lamoni, Iowa. USA. Crankshaft. Ref: NTSB file 3-3233.
E109	Piper PA-22	29 Sep 68	0	S Cumberland, Md. USA. Camshaft gear attach bolts. NTSB file 3-3302.
E110	Cessna 150G	1969	0	S King Is Ad, Tas. Australia. Exhaust valve rocker arm. Ref: Australia DoT.
E111	Cessna P206	1969	0	S Port Headland, WA., Australia. No. 5 cylinder head at threads. Australia DoT.
E112	Cessna 310F	19 Feb 69	4	D Reno, Nev. USA. Master & connecting rods. Ref: NTSB file 3-2460
E113	Aero Commander A-9B	8 Mar 69	0	S Selma, Cal. USA. Crankshaft at no. 5 crankpin. NTSB file 3-0355.
E114	Dutton SPL J-4	13 Apr 69	0	S Mesa, Ariz. USA. Crankshaft at propeller flange. Previous damage. Ref: NTSB file 3-0856.
E115	Lockheed 18-56 Lodestar	17 Apr 69	0	S Port Hardy, B.C. Canada. Piston link rod, left engine. Ref: MoT Canada file F-525.
E116	Piper PA-22	26 Apr 69	0	S Chenango Bridge, N.Y. USA. No. 4 cylinder barrel. Ref: NTSB file 3-0875.

ENGINE/TRANSMISSION (FIXED-WING)

E117 Boeing 75 Stearman	9 May 69	0	S Five Points, Cal. USA. Crankshaft broken in thrust nut thread area. Ref: NTSB file 3-1159.
E118 Cessna 195	22 May 69	1	D Flat Lake, Ont. Canada. No. 4 & 5 conrods failed due to no. 4 knuckle pin failure. Ref: NTSB file 6-0080
E119 Mooney M20C	23 Jun 69	1	D Banff, Alta. Canada. Engine failure, fatigue of rigid oil-pressure line, propeller governor to crankcase. Ref: MoT File 5002-4396.
E120 General Aircraft 42 Cygnet II	26 Aug 69	2	D Woerth, Bas-Rhin, France. No. 3 connecting rod. Ref: UK BoT CAP 351 p 22
E121 Douglas DC-8 (Eastern)	28 Nov 69	0	S Newark, N.J. USA. 12th stage compressor disc, no. 4 engine. Ref: NTSB file 1-0054.
E122 Cessna 177	1970	0	S Randalls Bay, Tas., Australia. Oil line failed due not modified type. Ref: Australia DoT.
E123 Handley Page Jetstream	6 Mar 70	11	D Samedan, Switzerland. 1st stage turbine disc of left engine. Material: Udimet 500. Ref: WAAS p. 8/70
E124 Piper PA-32 Cherokee SIX	12 Apr 70	0	D Belle, Mo. USA. Foreign piece of metal enmeshed in crankshaft idler gear, causing gear failure. Ref: NTSB file 3-1391.
E125 McDonnell Douglas DC-8-60 (SAS)	19 Apr 70	0	D Rome, Italy. Hub 1st stage fans of no. 1 engine. Ref: ICAO ADREP 128/70.
E126 Aero Commander 200-D	30 Apr 70	0	S Woodstock, Ga. USA. No. 2 conrod. Ref: NTSB file 3-4610.
E127 Saab-Scania S35E Draken (Swedish AF)	3 Jun 70	0	D Aalborg, Denmark. Compressor blade. Ref: Swedish AF
E128 Cessna 170A	6 Jun 70	0	S Greenfield, Ind. USA. No. 4 connecting rod. Ref: NTSB file 3-1220.
E129 Boeing A75 Stearman	13 Jun 70	0	S Sacramento, Cal. USA. No. 1 cylinder. Ref: NTSB file 3-2604.
E130 Boeing 727 (Eastern)	16 Jun 70	0	S Boston, Mass. USA. Compressor disc, 11th stage. NTSB file 4-0063.

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ENGINE/TRANSMISSION (FIXED-WING)

- E131 Grumman TBM-3 Avenger 21 Jun 70 1 D St. Martin, N.B. Canada.
Front bank master rod. MoT Canada file A0905.
- E132 Boeing 707 (BOAC) 22 Jun 70 0 S London, UK.
Disk diaphragm at runout of outboard radius of front integral spacer (8th stage HP compressor, no. 1 engine). Ref: WAAS p 15/70.
- E133 Aero Commander S-2R 27 Jun 70 0 S Eudora, Ark. USA.
Main governor drive gear sheared. Ref: NTSB file 3-2714.
- E134 Cessna 150 13 Jul 70 0 S Deer Park, N.Y. USA.
Crankshaft broke at no. 4 web above journal.
Ref: NTSB file 3-2590.
- E135 Saab-Scania A32A Lansen (Swedish AF) 13 Aug 70 0 D Oxelosund, Sweden.
Fuel pipe. Ref: Swedish AF
- E136 Saab-Scania S35E Draken (Swedish AF) 16 Sep 70 0 D Arvidsjaur, Sweden.
Compressor blade. Ref: Swedish AF
- E137 Piper PA-18 Super Cub 3 Oct 70 0 S Loxley, Ala. USA.
Carburetor cracked around back side of throat.
Ref: NTSB file 3-3891.
- E138 Jodel F-11 17 Oct 70 0 S Vernon, Ont. Canada.
Crankshaft (improper reconditioning). Ref:
MoT Canada file 00096.
- E139 Piper PA-23 Aztec 30 Nov 70 0 S Doylestown, Pa. USA.
Engine controls mount bracket assembly failed at pedestal. Ref: NTSB file 3-2406.
- E140 Lockheed TV-2 4 Dec 70 0 D Cheyenne, Wyo. USA.
Fatigue fracture, turbine assembly retention, blade. Ref: NTSB file 3-2173.
- E141 Piper PA 25-235 Pawnee 1971 0 D Moura, Queensland Australia.
Fatigue of mixture control part. (Not genuine part.) Ref: Australia DoT
- E142 Auster 5D 1971 0 S Camden NSW, Australia.
Valve assembly. Ref: Australia DoT.
- E143 McDonnell CF-101 Voodoo (Canadian Forces) 18 Feb 71 0 D Comox. B.C. Canada.
Starboard J57 engine compressor blade. Origin: platform area. Ref: CFAIRS.
- E144 Cessna 210K Centurion 24 Mar 71 1 D Roganville, Texas, USA.
Fillets of no. 2 main journal. NTSB file 3-0197.

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ENGINE/TRANSMISSION (FIXED-WING)

- E145 Stinson V-77 2 Apr 71 0 S Pleasant Plain, Ohio. USA.
 # 2 connecting rod (upper end). NTSB file 3-2156.
- E146 Aero Commander A-9B 16 Apr 71 0 D Purvis, Miss. USA.
 No. 5 conrod. Role: Spraying. NTSB file 3-1184
- E147 Beech 23 Musketeer 16 May 71 0 S Yuma, Ariz. USA.
 Aux fuel pump fitting (prior partial fracture).
 Ref: NTSB file 3-3886.
- E148 Piper PA-28R Cherokee 17 Jun 71 0 S Garnett, Kans. USA.
 Crankshaft (front portion of # 3 main journal).
 Ref: NTSB file 3-2095.
- E149 Boeing 707 (American) 21 Jul 71 0 S Dallas, Tex. USA.
 No. 3 engine, segment of no. 1 fan disk. Ref:
 WAAS p. 14/71.
- E150 Victa 210 CS 30 Jul 71 0 S Cromwell, New Zealand.
 Fuel discharge tube. Ref: NZ brief 71-074.
- E151 Cessna 172C 7 Aug 71 0 S Elmo, Pa. USA.
 Engine mixture control wire. NTSB file 3-2929.
- E152 North American AT-6G 27 Sep 71 2 D Davis Creek, Calif. USA.
 Fracture in heater shroud allowed engine exhaust to enter cockpit. NTSB file 3-4550
- E153 Beech A35 Bonanza 8 Oct 71 0 S Campo, Cal. USA.
 # 2 cylinder hold-down studs. NTSB file 3-4007.
- E154 Douglas DC-3C 11 Oct 71 0 S New Braunfels, Tex. USA.
 Fuel press ind/oil dilution restrictor fitting on right carb. Ref: NTSB file 3-3318.
- E155 Piper PA-28R Cherokee 26 Oct 71 0 S La Porte, Tex. USA.
 # 4 conrod cap. Ref: NTSB file 3-4199.
- E156 Boeing 747 (Eastern) 8 Nov 71 0 S Jamaica, N.Y. USA.
 No. 1 engine diffuser case near the no. 5 boroscope boss. Ref: WAAS p. 22/71. ICAO ADREP 1471/71.
- E157 Aero Commander A-9B 10 Nov 71 0 S Elmira, Cal. USA.
 Forward fillet of # 3 main journal of crankshaft. Ref: NTSB file 3-4449.
- E158 Beech M35 Bonanza 23 Nov 71 0 S Owosso, Mich. USA.
 Crankshaft. Ref: NTSB file 3-3301.
- E159 Snow Commander S2D 6 Dec 71 0 S Thompson Town, Jamaica.
 Master connecting rod at crank pin end. Ref: Jamaica.

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ENGINE/TRANSMISSION (FIXED-WING)

E160 Beech 65-80 Queen Air	9 Dec 71	7	D Oklahoma City, Okla. USA Left engine no. 5 conrod cap. Ref: NTSB NTSB file 3-3981
E161 LTV A-7 Corsair II (USAF or USN)	1972	?	D USA? Spacer collar between 1st & 2nd compressor stages, Rolls-Royce Allison TF41 Spey engine. Ref: AWST 3 Apr 72, p. 11.
E162 LTV A-7 Corsair II (USAF or USN)	1972	?	D USA? Spacer collar between 1st & 2nd compressor stages, Rolls-Royce Allison TF41 Spey engine. Ref: AWST 3 Apr 72, p. 11.
E163 LTV A-7 Corsair II (USAF or USN)	1972	?	D USA? Spacer collar between 1st & 2nd compressor stages, Rolls-Royce Allison TF41 Spey engine. Ref: AWST 3 Apr 72, p. 11.
E164 Convair 600 (Texas Int'l)	16 Feb 72	0	S Beaumont, Tex. USA. Low pressure impeller (right engine). Ref: NTSB file 1-0014.
E165 Douglas DC-9 (Delta)	19 Mar 72	0	S Atlanta, Ga. USA. Second stage compressor disc (# 2 engine). Separated at rear fan case. NTSB file 1-0011.
E166 Saab-Scania S32C Lansen (Swedish AF)	12 Apr 72	0	D Ostersund, Sweden. Fuel pipe. Ref: Swedish AF
E167 Cessna 120	19 Apr 72	0	S Watervliet, Mich. USA. Carburetor butterfly valve. NTSB file 3-1555.
E168 Cessna 411	30 Apr 72	0	S Monticello, Miss. USA. # 1 & 2 cylinder exhaust valves (right engine). Ref: NTSB file 3-2270.
E169 Cessna 210B	25 May 72	0	S Wappapello, Mo. USA. # 1 cylinder cracked. Ref: NTSB file 3-1898.
E170 Dassault Mirage III (RAAF)	17 Jul 72	0	D Butterworth, Malaysia. 7th stage compressor rotor ring. Manufacturing defect. Elongation of rivet holes. Ref: RAAF
E171 Beech V35 Bonanza	19 Jul 72	0	S Oneill, Neb. USA. Alum nipple broke at turbocharger attaching point. Ref: NTSB file 3-2601.
E172 Aero Commander 680E	9 Aug 72	0	S Cambridge, Ohio. USA. Crankshaft (3rd order counterweight ears). Ref: NTSB file 3-3270.

E173 Grumman OV-10 Mohawk (US Army)	12 Aug 72	1	D Vn. USA. Engine (disc). Ref: US Army.
E174 Fletcher FU24	14 Sep 72	0	S Ngaroma, New Zealand. Camshaft gear. Ref: NZ brief 72-082
E175 Snow S-2D	18 Sep 72	0	S Ngakuru, New Zealand. Master rod piston pin bore. Ref: NZ brief 72-084.
E176 Snow Commander S2D	25 Sep 72	0	S Windsor, Jamaica. No. 1 cylinder connecting rod. Ref: Jamaica.
E177 Fokker F-27 (ATI)	15 Oct 72	0	S Rome, Italy. Low pressure impeller. Ref: WAAS p. 31/72.
E178 de Havilland Comet 4C (Egyptair)	3 Nov 72	0	S Benina, Libya. No. 2 engine, H.P. turbine disk at rim. Ref: WAAS
E179 Cessna 172B	11 Nov 72	0	S Marton, New Zealand. No. 5 cylinder at base, in region of nos. 1 & 3 cooling fins. Ref: NZ brief 72-106.
E180 Cessna A188	7 Dec 72	0	S Ashley Gorge, New Zealand. No. 4 connecting rod. 4363 hours. Ref: NZ brief 72-119.
E181 Piper PA 25-235 Pawnee	1973	0	S Trentham Vic., Australia. Part impulse coupling cam fell between crank-shaft idler gear. Ref: Australia DoT.
E182 Piper PA 28-140 Cherokee	1973	0	S Moorabbin Vic., Australia. No. 2 connecting rod. Ref: Australia DoT.
E183 Beech M35 Bonanza	1973	0	S Morwell Vic. Australia. Crankshaft (by no. 2 connecting rod journal). Ref: Australia DoT.
E184 Beech P35 Bonanza	1973	0	S Mansfield Vic., Australia. Connecting rod bearing. Ref: Australia DoT
E185 Saab-Scania J35F Draken (Swedish AF)	10 Jan 73	0	D Vasteras, Sweden. Compressor blade. Ref: Swedish AF
E186 Boeing 707 (American)	20 Jan 73	0	S Elk Grove Village, Ill. USA. 3rd stage nozzle vane retaining lugs, no. 4 engine (fretting). Ref: NTSB file 1-0001.
E187 Stinson 108-1	23 Jan 73	0	S Fort Pierce, Fla. USA. No. 1 cylinder (at base). NTSB file 3-0294.
E188 Aero Commander A-9B	19 Feb 73	0	S Sunnymead, Cal. USA. Crankshaft. Ref: NTSB file 3-1521.

ENGINE/TRANSMISSION (FIXED-WING)

- E189 Cessna U206 7 Mar 73 0 D Kihei, Hawaii, USA.
Crankshaft at no. 2 journal. NTSB file 3-0991.
- E190 Grumman G-164 30 Mar 73 0 S Knights Landing, Cal. USA.
AgCat No. 9 cylinder. Ref: NTSB file 3-0745.
- E191 Beech A23 8 Apr 73 0 S Eden Prairie, Minn. USA.
Musketeer Dowel pin, all starter gear and crankshaft gear
attach bolts broken. Ref: NTSB file 3-1195.
- E192 Grumman G-164 2 Jun 73 0 S Church Point, La. USA.
AgCat Crankshaft. Ref: NTSB file 3-1274.
- E193 Piper PA-25 22 Jun 73 0 S Gettysburg, S. Dak. USA.
Pawnee Crankshaft. Ref: NTSB file 3-2063.
- E194 Snow S2C 30 Jun 73 0 S Pearsall, Tex. USA.
Crevice corrosion found on no. 7 piston pin.
Fatigue fracture. Ref: NTSB file 3-3193.
- E195 Globe GC-1B 28 Jul 73 0 D Ballston Spa, N.Y. USA.
Fuel line to carburettor. Ref: NTSB file 3-2309
- E196 Canadair 8 Aug 73 0 D Patuxtent, Md. USA.
CL-84 Gear broke in prop gearbox. 122.7 hours on part
Dynavert
- E197 Piper 19 Aug 73 0 D Helsinki, Finland.
PA-28-180 Forward end bearing of crankshaft broke
Cherokee (fatigue), due to an inside corrosion. Ref:
Finland BoA.
- E198 S.A.N. Jodel 3 Sep 73 3 D Brixham, U.K.
D.117 No. 2 cylinder at head attachment thread. Ref:
UK CAA rept 21/74
- E199 Bellanca 7 Sep 73 0 S Hammondsport, N.Y. USA.
14-19 No. 3 piston oil wiper ring, fractured at heel.
Ref: NTSB file 3-3814.
- E200 Saab-Scania 9 Oct 73 0 D Linkoping, Sweden.
AJ37 Viggen (Swedish AF) Compressor disc. Ref: Swedish AF
- E201 Cessna 310C 21 Nov 73 0 D Montrose, Colo. USA.
No. 1 cylinder barrel of engine separated.
Ref: NTSB file 3-4149.
- E202 C.A.C. Austrl. 1974 0 S Glen Innes, NSW, Australia.
CA-28C Ceres Cylinder assembly. Ref: Australia DoT.
- E203 Fokker F-27 6 Mar 74 0 S Khartoum, Sudan.
(Sudan Airways) Rear hub face of impeller (fretting), no. 2
engine. Ref: WAAS p.8/74.

E204 Piper PA-22	8 Mar 74	0 S Compton, Cal. USA. Piston of no. 3 cylinder. NTSB file 3-0415.
E205 Piper PA-24 Commander	14 Mar 74	0 S Highland Beach, Fla. USA. No. 2 conrod. Ref: NTSB file 3-0301.
E206 CallAir A-9B	14 Mar 74	0 S Calexico, Cal. USA. No. 5 connecting rod. Ref: NTSB file 3-0740.
E207 Stinson 108-1	17 Mar 74	0 S Tekoa, Wash. USA. Muffler fatigue fracture. NTSB file 3-1054.
E208 Stearman A75	29 Mar 74	0 S Pixley, Cal. USA. Crankshaft. Ref: NTSB file 3-0738.
E209 Dassault Mirage III (RAAF)	1 Apr 74	0 D Butterworth, Malaysia. Compressor first stage blade (manufacturing defect). Ref: Royal Australian Air Force.
E210 Piper PA-32 Cherokee SIX	4 Jun 74	0 S Friendship, Wis. USA. Oil filter center stud. NTSB file 3-4321.
E211 American AA-5	16 Jun 74	0 S Chula Vista, Cal. USA. Carb heat control cable. NTSB file 3-1662.
E212 Beech P35	30 Jun 74	0 D Tutelake, Calif. USA. No. 1 conrod bolt. Ref: NTSB file 3-1747.
E213 Cessna 150	31 Jul 74	0 S Cobble Hill, BC, Canada. No. 1 cylinder exhaust valve. Ref: MoT Canada file P40065.
E214 Piper PA-36 Pawnee Brave	2 Aug 74	0 S Winnemucca, Nev. USA. Crankshaft. Ref: NTSB file 3-2569.
E215 Vollmer Sportsman	3 Aug 74	0 S Webster, Wis. USA. No. 1 and 3 exhaust stacks. Ref: NTSB file 3-3468
E216 Aero Commander 600S-2R	17 Aug 74	0 S Lake Providence, La. USA. Exhaust side of no. 4 cylinder head. NTSB file 3-2567.
E217 Aero Commander S-2R	3 Sep 74	0 D Kuopio, Finland. Connecting rod. Ref: Finland BoA.
E218 Reims Avion F 172H	15 Sep 74	0 D Letmathe-Loessel, W. Germany. Connecting rod. Ref: W. German file 3X0412.
E219 Piper PA-30 Twin Commande	2 Oct 74	0 S Leavenworth, Kans. USA. Crankshaft. Ref: NTSB file 3-3432.
E220 Beech B24R	5 Oct 74	0 S Wallkill, N.Y. USA. No. 3 conrod. Ref: NTSB file 3-3725.

ENGINE/TRANSMISSION (FIXED-WING)

- E221 Piper PA-32 23 Oct 74 1 D Huntsville, Texas USA.
Cherokee SIX
No. 3 cylinder separated. Hold-down studs under-torqued, through bolts failed. Ref: NTSB file 3-4329
- E222 Beech H35 1 Dec 74 3 D Hayward, Calif. USA.
Bonanza
Crankshaft. Wrong propeller installed. Ref: NTSB file 3-4312
- E223 Cessna 377 6 Dec 74 0 S Cabonga Reservoir, Que. Canada.
Crankcase. Ref: MoT Canada file Q40120.
- E224 Beech V35 20 Dec 74 0 S St. Paul, Minn. USA.
Bonanza
No. 5 connecting rod bolts. Ref: NTSB file 3-4167
- E225 Hawker Siddeley HS 748 3 Feb 75 33 D Manila, Philippines.
(PAL)
3 bridges in flame tube of no. 5 combustion chamber failed, causing fire. Ref: WAAS p 4/75
- E226 Cessna U206 15 Mar 75 0 S Kenai, Alas. USA.
Crankshaft. Ref: NTSB file 3-1101.
- E227 Cessna T337 18 Mar 75 0 S Dubois, Id. USA.
Line to fuel flow gauge. NTSB file 3-4139.
- E228 Piaggio P.149-D1 13 Apr 75 0 S Neuenwalde, W. Germany.
Crankshaft. Vibration due to wear of bearings.
Ref: W. German file 3X0054.
- E229 Republic RC-3 Seabee 13 Apr 75 2 D Markham, Ont. Canada.
No. 6 cylinder. Ref: MoT Canada file 050025.
- E230 McDonnell CF-101 Voodoo 14 May 75 0 D Bagotville, Que. Canada.
(Canadian Forces)
Starboard engine caught fire during afterburner.
Crack adjacent to axial weld of engine casing.
Ref: CFAIRS.
- E231 Cessna 172L 3 Jun 75 0 S Mt. Sterling, Ill. USA.
Stepped dowel pin. NTSB file 3-3457.
- E232 Saab-Scania S35E Draken 5 Jun 75 0 D Lulea, Sweden.
(Swedish AF)
Compressor blade. Ref: Swedish AF
- E233 Cessna 402A 15 Jun 75 0 S Seattle, Wash. USA.
Exhaust manifold, right engine. NTSB file 3-1938.
- E234 Piper PA-22 18 Jun 75 0 S Wyoming, Ont. Canada.
No. 3 exhaust valve. MoT Canada file 050053.
- E235 Cessna 206B 23 Jun 75 0 S Imperial, Cal. USA.
No. 3 cylinder conrod bolts. NTSB file 3-1479.

- E236 de Havilland 25 Jun 75 0 S Unnamed lake, Que., Canada.**
DHC-3 Otter
Crack in valve rocker arm housing resulted in valve failure. Ref: MoT Canada file Q50062
- E237 Beech E18S 26 Jun 75 2 D Toledo Ohio, USA.**
Fatigue - cylinder head. Unapproved mod. Standpipe cut off flush with bottom of oil tank. Ref: NTSB file 3-2514
- E238 Cessna 182B 30 Jun 75 0 S Wachenheim, West Germany.**
Crankshaft. Ref: W. German file 3X0244.
- E239 Douglas Dakota (RAAF) 9 Jul 75 0 S Sale, Vic., Australia.**
R.h. engine, fracture of rear master connecting rod cap. Ref: Royal Australian Air Force.
- E240 Cessna 210 4 Aug 75 1 S Hope, BC, Canada.**
Connecting rod. Ref: MoT Canada file P50047.
- E241 Snow Commander S2D 15 Aug 75 0 S Riversdale, Jamaica.**
Master connecting rod. Ref: Jamaica.
- E242 Cessna 150F 16 Aug 75 0 S Jean, Nev. USA.**
Mixture control wire came loose at carburetor. Ref: NTSB file 3-1154.
- E243 Cessna 175 17 Aug 75 0 S Kenora, Ont. Canada.**
No. 5 cylinder. Ref: MoT Canada file C50117.
- E244 Saab-Scania Viggen (test aircraft) 27 Aug 75 0 D Karlsborg, Sweden.**
Compressor blade. Ref: Swedish AF
- E245 Piper PA-25 Pawnee 6 Sep 75 0 S Tahoka, Tex. USA.**
Crankshaft. Ref: NTSB file 3-3809.
- E246 Saab-Scania A32A Lansen (Swedish AF) 9 Sep 75 0 D Strangnas, Sweden.**
Turbine disc. Ref: Swedish AF
- E247 Boeing 727-200 (ANA) 17 Sep 75 0 S Tokyo, Japan.**
Welding parts (Ps4) of combustion chamber outer case. Origin: pitting corrosion. Ref: Japan MoT
- E248 Saab-Scania A32A Lansen (Swedish AF) 17 Nov 75 0 S Vanersborg, Sweden.**
Compressor disc. Ref: Swedish AF.
- E249 Cessna 207 1976 0 S Groote Eylandt, NT., Australia.**
Muffler baffles separated from rods. Ref: Australia DoT.
- E250 Cessna 421B 1976 0 S Norseman, WA, Australia.**
Broken weld joint on right-hand exhaust slip joint assembly. Ref: Australia DoT.

ENGINE/TRANSMISSION (FIXED-WING)

E251 Beech 36 Bonanza	1976	1	D Australia. Engine crankcase adjacent to cylinder attachment stud holes. Ref: Australia DoT
E252 de Havilland 82	1976	0	S Taree NSW, Australia. Rocker bracket bolts, no 4 cylinder. Ref: Australia DoT.
E253 Piper PA-24 Comanche	7 Jan 76	0	S Santee, Cal. USA. Crankshaft dowel pin. Ref: NTSB file 3-0153.
E254 Cessna 210	11 Jan 76	0	S Carpenteria, Cal. USA. Crankshaft. Ref: NTSB file 3-2550.
E255 Piper PA-32 Cherokee SIX	12 Jan 76	0	S Big Spring, Tex. USA. Crankshaft. Ref: NTSB file 3-1487.
E256 Beech V35 Bonanza	31 Jan 76	0	S Kings Park, N.Y. USA. Crankshaft. Ref: NTSB file 3-2884.
E257 Centre Est DR 400	29 Feb 76	0	D Gelnhausen, W. Germany. Fatigue failure of non-approved muffler. Ref: W. German file 3X0027.
E258 Stinson 108-1	24 Apr 76	1	D Aglasterhausen, West Germany. Crankshaft. Ref: West German file 3X0155.
E259 Cessna 185 Skywagon	29 Apr 76	0	S Whonnock Lake, B.C. Canada. Crankshaft. Ref: MoT Canada file P60017.
E260 Northrup CF-5 (Canadian Forces)	2 May 76	0	D Winnipeg, Man. Canada. #1 afterburner spray bar cracked. Torching burned through heat shield causing fire. Ref: CFAIRS.
E261 Aero Commander 600S-2R	6 May 76	0	S Hermiston, Ore. USA. Impeller shaft. Ref: NTSB file 3-2215.
E262 Cessna 210C Centurion	7 May 76	1	D Florence, Oregon, USA. Crankshaft failure. Main bearing misaligned - wrong con rod bearings. NTSB file 3-1614
E263 Beech 95-B55 Baron	29 May 76	4	D Holly Springs, Miss. USA Camshaft gear teeth failed, crack in undersized radii at gear teeth roots. Ref: NTSB file 3-4073
E264 de Havilland DHC-2 Mk I Beaver	2 Jul 76	0	S The Martin Hills, NWT. Canada. Unapproved hard brass fitting on fuel line inlet to carburetor. Ref: MoT Canada file W60056.
E265 Beech 65 Queen Air	27 Jul 76	0	S Bedford, Ma. USA. Crankshaft (#3 counter wt hanger). Ref: NTSB file 3-2363.

E266 Beech 58 Baron	3 Aug 76	6	D Chillicothe, Mo. USA. Crankshaft at no. 7 crankcheek. Ref: NTSB file 3-3539
E267 Piper PA-28-140 Cherokee	10 Aug 76	2	? Helsinki, Finland. Exhaust valve. Ref: Finland.
E268 Cessna 210	16 Aug 76	0	S Ellgau, W. Germany. Connecting rod bearing due to bushing wear. Ref: W. German file 3X0417.
E269 Aero Commander 112A	21 Aug 76	0	D Santa Ana, Calif. USA. Throttle-power lever assembly. NTSB file 3-3077
E270 Cessna 185E	28 Aug 76	0	S Wainwright, Alas. USA. Throttle-power lever assemblies, support shaft for bellcranks failed. Ref: NTSB file 3-3933.
E271 Reims Avion F-150L	7 Sep 76	0	S Tuensdorf, West Germany. Connecting-rod bearing damaged as a result of loss of oil through a broken dump valve. Ref: West German file 3X0469.
E272 Aerospatiale Caravelle (Indian Airlines)	12 Oct 76	95	D Bombay, India. Disintegration of 10th compressor stage of Rolls Royce Avon engine. Ref: FI 21 Oct. 78 p. 1459.
E273 Cessna 210B Centurion	21 Oct 76	1	S Granbury, Texas USA. Hold-down studs of no. 5 cylinder (undertorquing). Ref: NTSB file 3-4161
E274 Bellanca 17-30A	24 Oct 76	2	D Nakina, N.C. USA. Muffler-assembly ball joint cracked in weld area, causing burned ignition leads & engine failure. Ref: NTSB file 3-3401
E275 Piaggio P.166	1977	1	? Australia. Engine connecting rod. Ref: Australian DoT
E276 Cessna U206F	26 Feb 77	1	S Clarks Junction, New Zealand. Cracked tooth in camshaft cluster gear. Ref: NZ AAR 77-037
E277 Piper PA-36 Pawnee Brave	20 Apr 77	0	S Brawley, Cal. USA. No. 4 exhaust valve (thermal fatigue). Ref: NTSB file 3-2658.
E278 Piper PA-28 Cherokee	12 May 77	0	S Iowa City, Iowa. USA. Engine cylinder assembly. Ref: NTSB file 3-1097.
E279 Piper PA-34 Seneca	26 May 77	1	D Bridgeport, WV USA. Crankshaft at no. 3 main bearing journal. Ref: NTSB file 3-1764

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ENGINE/TRANSMISSION (FIXED-WING)

- E280 Globe GC-1A 5 Jun 77 1 S Erding, West Germany.
Rocker arm for exhaust valve. Ref: W. German file 3X0172.
- E281 Boeing A75-N1 11 Jun 77 0 S Sulphur, La. USA.
Stearman No. 2 link rod of piston. Ref: NTSB file 3-1111.
- E282 Cessna 210K 11 Jun 77 0 S Manor, Tex. USA.
Crankshaft. Ref: NTSB file 3-1581.
- E283 Cessna 210 Centurion 23 Jun 77 1 D Summerland Key, Florida USA.
Propeller cylinder separated, oil on windshield restricted vision. Ref: NTSB file 3-4044
- E284 Auster 5J1 2 Jul 77 0 S Dorsten-Wulfen, W. Germany.
Crankshaft. Ref: W. German file CX0013.
- E285 Beech 35 Bonanza 13 Jul 77 0 S Clinton, Iowa. USA.
Two supporting base studs of #2 cylinder. Ref: NTSB file 3-1633.
- E286 Cessna 172 11 Aug 77 0 S Pelican Lake, B.C. Canada.
Fractured oil line. Ref: MoT Canada file P70062.
- E287 Beech 65-80 Queen Air 13 Aug 77 3 D Vancleave, Miss. USA.
Crankshaft (crack at #5 connecting rod throw).
Ref: NTSB file 3-4189
- E288 Piper PA-28R Cherokee 20 Aug 77 0 S Los Angeles, Cal. USA.
Conrod bolts. Ref: NTSB file 3-3503.
- E289 Beech P35 Bonanza 21 Aug 77 1 D Pittsburgh, Penn. USA.
Crankshaft (crack in area where bearing rotated). Ref: NTSB file 3-4172
- E290 Beech E18S 22 Aug 77 2 D Catalina Island, Calif. USA.
Cracks in combustion heater allowed fumes into cockpit. Ref: NTSB file 3-3452
- E291 Cessna 180 Skywagon 28 Aug 77 0 S High Level, Alta. Canada.
Camshaft gear teeth (rough machining). Ref: MoT Canada file W70093.
- E292 Moravan 2526 2 Sep 77 0 S Schmidgaden, W. Germany.
Intake valve, #2 cylinder. Ref: W. German file 3X0469.
- E293 Piper PA-32 Cherokee SIX 9 Sep 77 0 S Verden-Sch., W. Germany.
Locking bolt on DC generator/alternator. Ref: W. German file 3X0532.
- E294 Saab-Scania AJ37 Viggen (Swedish AF) 22 Sep 77 0 D Lidkoping, Sweden.
Failure of ball retainer in drive-shaft ball-bearing. Ref: Swedish AF.

E295 Cessna 402B	29 Sep 77	2	D Mercer, Penn. USA. Crack in manifold couple permitted exhaust gas into wing, causing fire. Ref: NTSB file 3-4157
E296 Curtiss C-46	29 Sep 77	0	S Thompson, Man. Canada. Low oil pressure due to small piece of failed piston skirt which became wedged under oil pressure relief valve. MoT Canada file C70136.
E297 Cessna A185E	30 Oct 77	0	S 80 mi. SE Cornerbrook, Nfld. Canada. Air valve shaft in air intake box. Fastener hole drilled oversize and off-centre. Ref: MoT Canada file A70036.
E298 Saab-Scania J35F Draken (Swedish AF)	23 Nov 77	0	D Angelholm, Sweden. Turbine disc. Ref: Swedish AF
E299 Cessna T210L	23 Dec 77	0	S Moriarty, N.M. USA. Crankshaft. Ref: NTSB file 3-4074.
E300 Cessna 182M	1978	0	S Wangaratta Vict., Australia. No. 5 piston disintegrated. Ref: Australia DoT.
E301 N. American P-51 Mustang	15 Feb 78	0	S Ellisville, Ms. USA. Crankshaft at no. 4 webbing. NTSB file 3-0721.
E302 Grumman G-164 AgCat	11 May 78	0	S Elton, La. USA. Engine cylinder assembly. Ref: NTSB file 3-1165.
E303 Cessna 210-5	20 May 78	0	D Phoenix, Ariz. USA. Crankshaft. Ref: NTSB file 3-3668.
E304 Cessna 172A	4 Jun 78	0	S Trail, B.C. Canada. # 2 cylinder 1" below top of barrel. Origin: rough machining. Ref: MoT Canada file P80043
E305 Cessna 172	9 Jun 78	0	S La Conception, Que. Canada. #3 exhaust valve assembly. MoT Canada file Q80038.
E306 Cessna 185 Skywagon	14 Jun 78	0	S Chilliwack, B.C. Canada. Induction airbox shaft, providing pivot on throttle bellcrank. Ref: MoT Canada file P80047.
E307 Beech 18	19 Jun 78	0	D Windsor Locks, Ct. USA. No. 2 bearing of no. 1 engine failed. No. 2 power turbine blade failed. NTSB file 3-2328
E308 Piper PA-32 Cherokee SIX	23 Jun 78	0	S Goshen, Ind. USA. # 4 cylinder. Ref: NTSB file 3-3990.
E309 Dornier DO 27B-1	27 Jun 78	0	D Varberg, W. Germany. Exhaust valve of cylinder #2. Ref: W. German file 4X0031.

ENGINE/TRANSMISSION (FIXED-WING)

- E310 Saab-Scania 30 Jun 78 0 D Vasteras, Sweden.
J35F Draken
(Swedish AF) Turbine disc. Ref: Swedish AF.
- E311 Beech M-35 2 Jul 78 0 S Riveredge, Ohio. USA.
Bonanza Fuel injection system fracture. Flow divider diaphragm and shaft cup seal aged. Ref: NTSB file 3-1843.
- E312 Piper PA-28 16 Jul 78 0 S Saitama Pref., Japan.
Cherokee #2 cylinder exhaust push rod. Ref: Japan.
- E313 Piper PA-28 19 Jul 78 0 S Causapscal, Que. Canada.
Cherokee #3 cylinder. Aircraft had flown only 17 hours in Cruiser 12 years. Ref: MoT Canada file Q80056.
- E314 Centre Est 29 Jul 78 0 S Leer-Nuettermoor, W. Germany.
DR 253 Exhaust valve. Ref: W. German file 3X0304.
- E315 Dyke JD-1 5 Aug 78 0 S Fort Bridger, Wy. USA.
Delta Exhaust muffler broke loose from fatigue. Ref: NTSB file 3-2688.
- E316 Grumman G-21A 2 Sep 78 4 D St. Thomas, Virgin Islands.
Goose Cylinder assembly. Ref: NTSB file 3-3128.
- E317 Cessna 182Q 7 Sep 78 0 S San Antonio, Tex. USA.
Carb heat control cable improperly rigged, bent, failed. Ref: NTSB file 3-2860.
- E318 Cessna 402B 7 Sep 78 0 D Hyder, Arizona USA.
Fracture of exhaust system from excessive vibration. Bolt connecting ball joint on right side of left engine missing. Ref: NTSB file 3-4362.
- E319 Cessna 150L 17 Sep 78 0 S Strathlorne, N.S. Canada.
#4 connecting rod cap (outer corners of oil scavange hole). Ref: MoT Canada file A80031.
- E320 Grumman 4 Oct 78 2 D Littleton, Colo. USA.
American AA-5 No. 3 cylinder at folds between barrel fins. Ref: NTSB file 3-4417.
- E321 Beech 36 10 Nov 78 0 S Unalakleet, Alas. USA.
Bonanza Crankshaft. Ref: NTSB file 3-4310.
- E322 Socata 893A 19 Nov 78 0 S Duena, W. Germany.
Rallye Commodore Broken oil line of engine. Ref: W. German file 3X0477.
- E323 Aero 28 Dec 78 1 D Oklahoma City, Okla. USA.
Commander 680 Conrod in left engine. NTSB file 3-4415.

E324 Cessna U206	1979	0	S Mt. Isa Qld., Australia. No. 6 cylinder separated (crack in flange). Loose hold-down nut. Ref: Australia DoT.
E325 Beech A24 Musketeer	1979	0	S Marulan NSW, Australia. Piston pin (faulty manufacture). Ref: Australia
E326 Beech 58P Baron	29 Jan 79	0	S Amarillo, Tex. USA. Crankshaft. Ref: NTSB file 3-0582.
E327 Beech 58 Baron	5 Feb 79	0	S Kalgoorlie WA, Australia. No. 3 cylinder inlet valve. Ref: Australia DoT.
E328 Saab-Scania J35F Draken (Swedish AF)	6 Feb 79	0	D Västervik, Sweden. Turbine screw. Ref: Swedish AF.
E329 Cessna 150	27 Feb 79	0	S Anchorage, Alas. USA. Head of # 3 cylinder. Ref: NTSB file 3-0986.
E330 Cessna 172	15 Mar 79	0	S Cedar Key Airport, Fla. USA. # 3 cylinder barrel (corrosion pits). Ref: MoT Canada file F90014.
E331 Fokker F-27 (Quebecair)	29 Mar 79	17	D Quebec City, Que. Canada. Engine failure from crack in engine compressor, low-pressure impellor, Ref: ICAO ADREP 2015/79
E332 Stinson 108-2	14 Apr 79	0	S Sidney, Mont. USA. # 1 cylinder at base. NTSB file 3-0469.
E333 Cessna 210 Centurion	17 Apr 79	6	D Cable, Wi. USA. No. 3 exhaust valve. NTSB file 3-3959
E334 Piper PA-22	25 Apr 79	0	S King City, Cal. USA. No. 2 conrod. Ref: NTSB file 3-1789.
E335 Cessna 150	27 May 79	0	S Turku, Finland. Engine cylinder. Ref: Finland BoA.
E336 Mooney M-20E	4 Jun 79	0	S Idar-Oberstein, W. Germany. Stud of #3 cylinder. Ref: W. German file 3X0171
E337 Grumman TBM-3E Avenger	15 Jun 79	0	D Sevogle, NB, Canada. Carburettor hot air door in air intake duct broke off and blocked carb intake. Origin: bolt holes. Ref: MoT Canada file 79-A00018.
E338 de Havilland DHC-2 Beaver	25 Jul 79	0	D Yarrowitch NSW, Australia. Cracked cylinder head. Ref: Australia DoT.
E339 Piper PA 18-150 Super Cub	23 Aug 79	0	S Schwatka Lake, Y.T. Canada. Rear section of valve in carb heat box. Ref: MoT Canada file W90078.

ENGINE/TRANSMISSION (FIXED-WING)

E340 Cessna 172K	30 Aug 79	0	S Hopewell, Va. USA. Crankshaft. Ref: NTSB file 3-3446.
E341 Saab-Scania S35E Draken (Swedish AF)	30 Aug 79	0	D Katrineholm, Sweden. Turbine disc. Ref: Swedish AF.
E342 Cessna 207	8 Sep 79	0	S Umiat, Ak. USA. Crankshaft at no. 2 journal. NTSB file 3-3616.
E343 Beech A36 Bonanza	10 Sep 79	0	S Cincinnati, Ohio. USA. Crankshaft. Ref: NTSB file 3-3222.
E344 Beech N35 Bonanza	11 Sep 79	1	D Olean, N.Y. USA. Crankshaft failed at crack 80% thru long crankcheek between no. 1 & no. 2 crank pins. Ref: NTSB file 3-3667
E345 Beech 36 Bonanza	21 Sep 79	0	S Bassett, Ne. USA. Crankshaft. Ref: NTSB file 3-2883.
E346 Ted Smith Aerostar 601P	16 Nov 79	3	D Charlstadt, N.J. USA. Exhaust pipe assembly at flange weld. Ref: NTSB file 3-3966.
E347 Cessna 210	19 Nov 79	0	S Beckwourth, Cal. USA. Crankshaft at no. 5 and 6 cylinder journals. Ref: NTSB file 3-3880.
E348 Ryan PT-22	5 Feb 80	0	S Oakland, Ca. USA. Crankshaft. Ref: NTSB file 3-1409.
E349 Cessna 172	6 Feb 80	0	S Bruce, Wi. USA. Oil pump drive gear shaft. NTSB file 3-0368.
E350 Piper PA-28R Cherokee	12 Feb 80	0	S Sherman, Il. USA. Crankshaft. Ref: NTSB file 3-0064.
E351 Cessna 182	16 Feb 80	0	S Wandering River, Alta. Canada. Rocker arm support boss (overtorqued locking bolt). Ref: MoT Canada file W00014.
E352 Piper PA-31T Cheyenne	12 Mar 80	0	S Kettleman City, Ca. USA. 2 compressor turbine vanes eroded and 3 blades fractured. Ref: NTSB file 3-2582.
E353 Ilyushin IL-62 (LOT Polish Airlines)	14 Mar 80	87	D Warsaw, Poland. Failure of shaft of no. 2 engine, damaging 2 other engines & control system for tail surfaces. Ref: ICAO ADREP 22/80.
E354 General Dynamics F-16 (USAF)	26 Mar 80	0	D Hill AFB, Utah USA. 9th stage compressor disk on P&W F100 engine. Ref: AWST 2 June 80, p. 65.

E-25
ENGINE/TRANSMISSION (FIXED-WING)

- E355 Grumman G-164B AgCat 19 Apr 80 0 D Billings, Mont. USA.
Mixture push-pull rod fractured at thread.
Ref: NTSB file 3-0649.
- E356 Grumman G-164 AgCat 26 Apr 80 0 S Palermo, Ca. USA.
No. 1 cylinder head. Ref: NTSB file 3-1479.
- E357 Piper PA-28 Cherokee Cruiser 9 May 80 3 D Desboro, Ont. Canada
No. 3 cylinder, fracture of all 8 cylinder studs (improper torquing of studs). Ref: MoT Canada file 80-000903
- E358 Steen Skybolt I 22 May 80 0 S Brantford, Ont. Canada.
Connecting rod bolt. Induced by over-speeding attributed to conversion of approved constant speed prop to fixed pitch. Ref: MoT Canada file 000027.
- E359 Stinson 108 Voyager 9 Jun 80 0 S Rockland, Ont. Canada.
Crankshaft aft of front main bearing. Origin: grinding crack. Ref: MoT Canada file 000904.
- E360 Cessna 185 17 Jun 80 0 S Iliamna, Ak. USA.
Mixture-control valve shaft on induction system airbox. Ref: NTSB file 3-1680.
- E361 Cessna P210 10 Jul 80 1 D Marcellus, Mi. USA.
Cylinder separated after fatigue of under-torqued thru-bolts & hold-down studs. Ref: NTSB file 3-3721
- E362 Grumman G-164 AgCat 30 Jul 80 0 S Samson, Al. USA.
Crankshaft, front counterweight assembly.
Ref: NTSB file 3-1829.
- E363 de Havilland DHC-2 Mk I Beaver 7 Aug 80 0 S Bartlett's Pond, Nfld. Canada.
No. 2 cylinder head separated from barrel.
Ref: MoT Canada file A00022.
- E364 Piper PA-20 Pacer 18 Aug 80 0 S East Gore, N.S. Canada.
Oil line fitting in oil cooler (corrosion pits in thread roots). Ref: MoT Canada file A00025.
- E365 Piper PA-18 Super Cub 22 Aug 80 1 S Exeter, R.I. USA.
No. 3 exhaust valve. Ref: NTSB file 3-1743.
- E366 Cessna 150 5 Sep 80 0 S Wellandport, Ont. Canada.
No. 3 cylinder rocker shaft support. Ref: MoT Canada file 000085.
- E367 McDonnell Douglas TF/A-18 Hornet (US Navy) 8 Sep 80 0 D Middle Wallop, England.
Low-pressure turbine disk of right engine.
Crack began at large flaw. Material: Rene 95.
Ref: FI 3 Jan 81 p 29.

E-26
ENGINE/TRANSMISSION (FIXED-WING)

- E368 De Havilland 10 Sep 80 3 D Whitehorse, Yukon Canada.
 DHC-2 Mk.1
 Beaver No. 3 piston pin. Origin: corrosion pitting.
 Ref: MoT Canada file 80-W00099.
- E369 Stampe SV-4B 10 Oct 80 0 D Baragwanath, Republic of South Africa.
 Crankshaft failed just behind thrust bearing.
 Ref: South Africa DoT.
- E370 H.S. Harrier 28 Oct 80 0 D Kaleborn, W. Germany
 GR.3 (RAF) FOD damage to fan, fatigue cracks propagated from impact mark, h.p. compressor blade failed.
 Ref: FI 28 Nov. 81, p 1612.
- E371 Piper PA-38 17 Nov 80 2 D Santa Rosa, Calif. USA.
 Tomahawk 2 Pushrod of #4 intake valve flared. Thermal fatigue of valve. Ref: NTSB file 3-3738.
- E372 Piper PA-24 30 Nov 80 1 D Annawan, Ill. USA.
 Commanche Crankshaft counterweight assembly at machining groove. Ref: NTSB file 3-3241.
- E373 Beech 55 10 Dec 80 0 S Edmonton, Alta. Canada.
 Baron No. 6 cylinder - piston con rod through I-beam section. Fatigue initiated as a result of rod having been bent by hydraulic lock. Ref: MoT Canada file W00071.
- E374 Cessna P206 1981 0 D Kilcoy, Queensland Australia.
 #4 cylinder exhaust valve. Ref: Australia DoT.
- E375 Commonwealth 1981 0 S Glenreagh NSW, Australia.
 CA-28 Ceres No. 3 cylinder exhaust rocker arm cover. Ref: Australia DoT.
- E376 Beech F33A 3 Jan 81 0 S St. Paul, Mn. USA.
 Bonanza Poor quality control. No radius on fillet of camshaft where undercut for oil holes. Also undercut 0.005". Ref: NTSB file 3-0033.
- E377 Piper PA-24 10 Jan 81 0 S Olympia, Wa. USA.
 Commanche Crankshaft. During re-nitriding, temps exceeded allowable, lowering core hardness. Ref: NTSB file 3-2730.
- E378 Cessna U206F 12 Jan 81 0 S Sherburne, Mn. USA.
 Crankshaft no. 2 main journal. NTSB file 3-0191
- E379 Saab-Scania 10 Feb 81 0 D Karlsborg, Sweden.
 AJ37 Viggen (Swedish AF) Shaft failure in engine gear-box due to ball-bearing failure. Ref: Swedish AF.
- E380 Cessna 150M 18 Feb 81 0 S Eudora, Ks. USA.
 No. 4 cylinder at 5th cooling fin from mounting flange. Ref: NTSB file 3-0761.

E381 Cessna 210N	22 Feb 81	0	S Miyagi Pref., Japan. Piston pin. Ref: Japan MoT.
E382 SIAI-Marchetti SF.260M (Belgian AF)	13 Mar 81	0	D Renaix, Belgium. Failure of crankshaft lug due to bad installation of counterweight rollers. Ref: Belgium AA.
E383 Cessna 180	14 Mar 81	0	S Shishmaref, Ak. USA. No. 5 cylinder failed in threaded area near cylinder head. Ref: NTSB file 3-0412.
E384 Mooney M-20G	21 Mar 81	2	D Ryegate, Mt. USA. Mufflers, poor weld, corrosion and fatigue fracture. Ref: NTSB file 3-1456.
E385 Beech A23-24	31 Mar 81	0	S Sawyer, Ky. USA. No. 4 cylinder wall. Ref: NTSB file 3-1474.
E386 Stinson 108-1	13 Apr 81	0	D Manahawkin, NJ, USA. Crankshaft. Ref: NTSB file 3-2889.
E387 Mooney M-20K	3 May 81	0	S Churchville, Md. USA. No. 5 piston (voids). NTSB file 3-2081.
E388 Piper PA-28 Cherokee Cruiser	5 Jun 81	0	S Stony Rapids, Sask. Canada. Exhaust valve at stem-to-head fillet. Origin: corrosion pits. Ref: MoT Canada file C10045.
E389 Piper PA-31P Pressurised Navajo	8 Jun 81	0	S Dallas, Tx. USA. Left engine lower tailpipe bracket failed. No inspection as per AD. Ref: NTSB file 3-1988.
E390 Cessna 150	5 Jul 81	0	S Georgetown, Ca. USA. Mixture control bracket (outside the weld on exhaust cross-over brace). Ref: NTSB file 3-1791
E391 Cessna 180 Skywagon	11 Jul 81	0	D Lake Margane, Que. Canada. Crankshaft. Ref: MoT Canada file Q10066.
E392 Piper PA-28 Cherokee	19 Jul 81	1	D Buckland, NC. USA. No. 3 cylinder exhaust valve (worn guide). Ref: NTSB file 3-3090.
E393 N. American S-21 Thrush Commander	23 Jul 81	0	S Fox Creek, Alta. Canada. No. 1 cylinder, fillets between cooling fins. Ref: MoT Canada file W10083.
E394 Mooney M-20K	25 Jul 81	0	S Defuniak Springs, Fl. USA. No. 2 conrod. Ref: NTSB file 3-2186.
E395 Mooney M-20F	30 Jul 81	0	S Licking, Mo. USA. Crankcase. Ref: NTSB file 3-2244.
E396 Rockwell S-2R	5 Aug 81	0	D Clarksburg, Ca. USA. Cylinder assembly. Ref: NTSB file 3-2344.

ENGINE/TRANSMISSION (FIXED-WING)

- E397 Saab-Scania 29 Aug 81 0 D Lulea, Sweden.
SF37 Viggen
(Swedish AF) Fuel pipe. Ref: Swedish AF.
- E398 Piper PA-32 23 Sep 81 0 S Cranbrook, B.C. Canada.
Cherokee SIX Crankshaft web. Ref: MoT Canada file P10101.
- E399 Bucker Jung 3 Oct 81 2 D Baltimore, Md. USA.
1.131 Crankshaft. Rear cone of prop hub not installed. Ref: NTSB file 3-3089.
- E400 Aero 4 Oct 81 0 S Bakersfield, Ca. USA.
Commander S-2R No. 1 cylinder (threads). Ref: NTSB file 3-2365
- E401 Cessna A150L 11 Oct 81 1 D Oak Ridge, Tn. USA.
No. 4 cylinder. Ref: NTSB file 3-3091.
- E402 Piper PA-32 24 Nov 81 0 S Woodland, Ca. USA.
Cherokee SIX No. 5 cylinder. Ref: NTSB file 3-3004.
- E403 Cessna 172K 27 Dec 81 0 D Laguna Beach, Ca. USA.
Mixture control wire failed (constant bending).
Clamp bolt would not rotate. NTSB file 3-3274.
- E404 Airbus Ind. 17 Mar 82 0 D Sanaa Airport, North Yemen.
A300 H. p. turbine disk failed, fillet radius.
(Air France) GE CF6-50 engine. Ref: AWST 5 Apr 82 p 33.
- E405 Swearingen 23 Mar 82 0 S Saskatoon, Sask. Canada.
SA-226TC Stator support (thermal fatigue due to engine
Metro II start-ups). Ref: MoT Canada file C20022.
- E406 Lockheed C-5A May- ? ? USA?
Galaxy Oct 82 Cracking in compressor rear frames, GE TF39-1C
(USAF) engine. Fire caused \$400,000 damage.
Ref: AWST 18 Oct 82 p 19.
- E407 Lockheed C-5A May- ? ? USA?
Galaxy Oct 82 Cracking in compressor rear frames, GE TF39-1C
(USAF) engine. Fire caused \$1,200,000 damage.
Ref: AWST 18 Oct 82 p 19.
- E408 Cessna 177 29 Aug 82 0 S Midnapore, Alta. Canada.
Gearing failure in oil pump. Ref: MoT Canada
file W20072.

Total Fatalities: 536

* APPENDIX F *
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* FIXED-WING AIRCRAFT - PROPELLER *

ID No.	Aircraft Type	Accident Date	No. Dead	D m	Remarks
F1	Type unknown	pre-1941	0	D USA.	Propeller blade. Origin: stress concentration where patent number was stamped into blade. 115 airframe hours. Ref: pp 2-3 in PREVENTION OF THE FATIGUE OF METALS UNDER REPEATED STRESSES, Batelle Memorial Institute staff, 1941.
F2	Douglas DC-3	11 Jan 46	0	S Indianapolis, Ind. USA. Right propeller. Ref: WAAS p. 1/46.	
F3	Lockheed L-049 Constellation (T.W.A.)	18 Nov 47	5	D New Castle, Delaware USA. Propeller blade. Ref: WAAS p 20/47.	
F4	Lockheed L-649 Constellation (Eastern)	7 Feb 48	1	S Bunnell, Fla. USA. Propeller blade. Ref: WAAS p 4/48	
F5	Douglas DC-6 (American Airlines)	21 Aug 50	1	S Eagle, Colo. USA. Propeller blade (scratch on blade). Ref: ICAO Circular 24-AN/21, 1952, p. 11.	
F6	Boeing 377 Stratocruiser (Pan American)	29 Apr 52	50	D Carolina, Brazil. Propeller failure caused separation of no. 2 engine. Ref: WAAS p 7/52; AW May 9/55, p 18	
F7	Fairchild C-119 Packet (USAF)	Nov 52	9	? Billings, Montana USA. Propeller blade broke 46 inches from tip. Ref: AW Jan. 19/53 p. 17.	
F8	Lockheed L-749A Constellation (Air France)	3 Aug 53	4	D Fethiye, Turkey. Propeller blade. Ref: WAAS p 15/53.	
F9	Boeing 377 Stratocruiser (Pan American)	26 Mar 55	4	D Off Oregon coast, USA. No. 3 engine tore loose after propeller failure. Ref: AW Jan. 2/56 pp 45-53.	
F10	Douglas DC-6A (Pan Am)	21 Jun 59	0	D Shannon, Ireland. No. 1 blade of no. 4 prop. Previous blade bending disrupted compressive stresses in shot peened area. Ref: WAAS p. 12/59	

F-2
PROPELLER (FIXED-WING)

- F11 Cessna 180 22 Nov 61 1 D Mangakino, New Zealand.
Propeller blade separated. Crack on inside of clamp of propeller blade. Role: agricultural fertilizing. Ref: NZ AIB Report 25/3/1194
- F12 de Havilland 18 Jun 62 0 S Winnipeg, Man. Canada.
DHC-1 Chipmunk Prop blade shed just outboard of attaching bolts (fretting from inadequate torquing). Ref: MoT Canada file 1694.
- F13 Grumman 17 Jul 62 0 S Catalina Is., Cal. USA.
G-21A Goose (Avalon) No. 3 prop blade (blade retention flange radius at blade trailing edge). REF: USACAD.
- F14 Beech A55 30 Jan 64 0 S Kansas City, Mo. USA.
Baron Propeller (threads). Ref: NTSB file 3-0395.
- F15 Cessna 1 Feb 64 0 S Bolivar, Mo. USA.
210 Propeller blade. Ref: NTSB file 3-0194.
- F16 Cessna 185 13 Apr 64 0 S Sullivan Bay, B.C. Canada.
Propeller blade at thread roots. Ref: MoT Canada file 2221.
- F17 Douglas 14 Apr 64 0 S Melbourne, Australia.
DC-6B (Ansett-ANA) No. 3 blade of no. 3 prop (8.5" from butt). Origin: surface burn (electrical?). Ref: WAAS p. 11/64.
- F18 Mooney Mk21 7 Jul 64 0 S Mansfield, Mo. USA.
Propeller blade. Ref: NTSB file 3-1981.
- F19 Mooney M-21 6 Sep 64 0 S Calpine, Cal. USA.
Propeller blade. Ref: NTSB file 3-3503.
- F20 Beechcraft 16 Sep 64 0 S Fort Lauderdale, Fla. USA.
E18S Propeller blade. Ref: NTSB file 3-2927.
- F21 Piper PA-28 9 Dec 64 0 S Burbank, Cal. USA.
Cherokee Propeller blade. Ref: NTSB file 3-3893.
- F22 Stinson 29 Dec 64 0 D Van Nuys, Calif. USA.
108-3 Propeller blade. Ref: NTSB file 2-0880.
- F23 Beech E18S 3 Jan 65 4 D Henderson, Ky. USA.
Engine tear-away after in-flight separation of no. 1 propeller blade. NTSB file 2-0599
- F24 Cessna 3 Jan 65 0 S Burns, Ore. USA.
180 Propeller blade (threads). NTSB file 3-3949.
- F25 Lockheed 15 Feb 65 0 S Okarche, Okla. USA.
L-188 Electra Propeller, manufacturer defect. NTSB file 2-0062.
- F26 Mooney M-20E 16 Feb 65 0 S Woodward, Okla. USA.
Propeller blade (sharp nick). NTSB file 3-0792.

AD-A137 254

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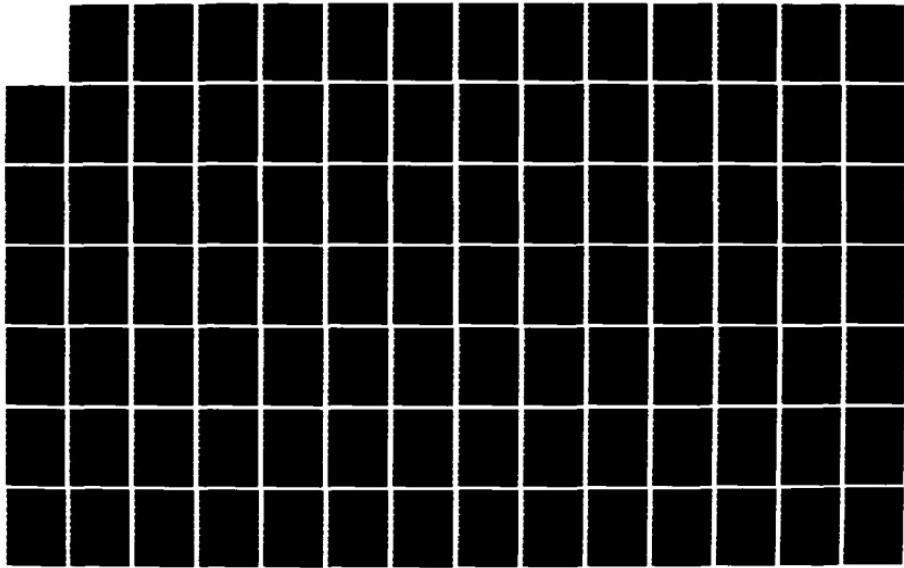
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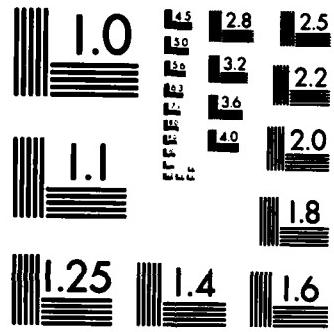
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F/G 1/2

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- F27 Boeing A75-N1 8 Mar 65 1 D Sherrill, Ark. USA.
Stearman Propeller, blade retention mechanism. Ref: NTSB file 2-0281
- F28 Temco D-16A 7 Apr 65 0 D Jacksonville, Texas USA.
Right propeller blade 30 in. from hub. Ref: NTSB file 3-2125.
- F29 Ercoupe 415C 6 May 65 0 S Carlsbad, Cal. USA.
Propeller failure (taper hub), improperly secured prop hub bolts. Ref: NTSB file 3-1669.
- F30 Beech 95-B55 Baron 6 Jun 65 0 S Schenectady, N.Y. USA.
Right engine propeller mounting bolts. Ref: NTSB file 3-3270.
- F31 Boeing A75 Stearman 9 Jul 65 0 S Homedale, Id. USA.
Propeller blade (12" from tip). NTSB file 3-2100.
- F32 Stinson 108 19 Aug 65 0 S Fairbanks, Alas. USA.
Prop blade. Metal leading edge separated from wood prop blade. Ref: NTSB file 3-2458.
- F33 Piper PA-28 Cherokee 11 Jan 66 0 S Fayetteville, Ark. USA.
Propeller blade. Ref: NTSB file 3-0084.
- F34 Mooney M-20B 6 Feb 66 0 S Bellview, N.Mex. USA.
Propeller blade broke 15" from tip. Ref: NTSB file 3-4432.
- F35 Convair 240 (Trans-Texas) 12 May 66 0 S Fort Worth, Tex. USA.
Right engine no. 3 propeller blade. Ref: NTSB file 1-0036.
- F36 Fleet Model 1 15 May 66 0 S St. Petersburg, Fla. USA.
Propeller hub. Ref: NTSB file 2-0067.
- F37 Beech A23 Musketeer 6 Jul 66 0 S Boulder, Colo. USA.
Propeller blade (improper blade). Ref: NTSB file 3-4390.
- F38 Piper PA-28 Cherokee 10 Jul 66 0 S Flushing, N.Y. USA.
Propeller blade (origin: small pit). Ref: NTSB file 3-4014.
- F39 Piper PA-28 Cherokee 23 Jul 66 0 S Columbia City, Ind. USA.
Propeller blade failed across the mid-blade decal. Required corrosion inspection not done. Ref: NTSB file 3-2402.
- F40 Cessna 180 24 Jul 66 0 S Athabasca, Alta. Canada.
5 1/2 inches of no. 1 blade shed, (nick). Ref: MoT Canada file 3055.

P-4

PROPELLER (FIXED-WING)

- F41 de Havilland 114 Heron 3 Aug 66 0 S San Juan, Puerto Rico.
No. 4 propeller separated (prop barrel). Ref:
NTSB file 3-4407.
- F42 Boeing A75 Stearman 14 Aug 66 0 D Dos Palos, Calif. USA.
Propeller blade. Ref: NTSB file 3-2419.
- F43 Snow 600 S-2C 29 Aug 66 0 S Bay, Ark. USA.
Propeller blade, 13" from tip. NTSB file 3-2805
- F44 Boeing A75 Stearman 2 Sep 66 0 S Gustine, Cal. USA.
Blade in shank area (unapproved blades). Ref:
NTSB file 3-2511.
- F45 Beech D18S 10 Feb 67 3 D Dallas, Texas USA.
Propeller blade at shank radius. Ref: NTSB file
2-0120
- F46 Convair 340 (Lake Central) 5 Mar 67 38 D Marseilles, Ohio. USA.
4 prop blades separated. Helical splines of
torque piston failed because of omission of
nitriding process. Torque cylinder of blade
pitch-change unit failed from fatigue. Ref:
NTSB file 1-0001
- F47 Mooney M-20E 6 Mar 67 0 S Pendleton, Ore. USA.
6" of propeller blade separated. NTSB file 3-0923
- F48 Mooney M-20C 12 Mar 67 0 S Mangum, Okla. USA.
Propeller hub. Ref: NTSB file 3-0557.
- F49 Piper PA-23 Aztec 27 Mar 67 0 S Granville, N.Y. USA.
Right propeller attach studs. NTSB file 3-1023
- F50 Boeing 75N1 Stearman 30 Mar 67 0 D McKittrick, Calif. USA.
Propeller blade. Role crop control. Ref: NTSB
file 3-1049.
- F51 Mooney M-20D 8 Apr 67 0 S Erie, Colo. USA.
Propeller hub. Ref: NTSB file 3-1194.
- F52 Mooney M-20E 15 May 67 0 S Dighton, Kans. USA.
Prop blade (4 1/2" from tip). NTSB file 3-1709.
- F53 Cessna 185C 18 May 67 0 S Houma, La. USA.
Propeller blade (next to hub). NTSB file 3-4791.
- F54 Funk F-23A 26 Jun 67 0 S Alliance, Neb. USA.
Propeller hub at blade attach point. Ref: NTSB
file 2-0484.
- F55 Cessna 150 29 Jun 67 0 S Naperville, Ill. USA.
6" of tip of blade separated (stone damage). Ref:
NTSB file 3-4631.

F56 Beech A23 Muskeeteer	8 Jul 67	0	S Aqua Dulce, Cal. USA. 19" of propeller blade separated. AD not complied with. Ref: NTSB file 3-2291.
F57 Vickers Viscount (Falcon Airways)	23 Jul 67	0	S Over Germany. Propeller retaining bolt (incorrect assembly). Ref: WAAS p. 16/67.
F58 Cessna 310D	11 Sep 67	0	S Clovis, N.Mex. USA. 1 foot of left prop failed. NTSB file 3-4819
F59 Boeing B75N1 Stearman	16 Oct 67	0	D Gilliam, La. USA. Propeller blade. Role crop seeding. Ref: NTSB file 2-0795.
F60 Beech S35 Bonanza	22 Oct 67	0	S Baton Rouge, La. USA. Propeller (improper heat treated blade and hub workmanship at time of mfg). NTSB file 3-4827.
F61 Stinson 108	22 Oct 67	0	S Moweaqua, Ill. USA. Crankshaft propeller bolt flange. Ref: NTSB file 2-0785.
F62 Mooney M-20E	29 Oct 67	0	S Fort McCoy, Fla. USA. Propeller blade. (origin: corrosion pit). Ref: NTSB file 2-1201.
F63 Beech B50 Twin Bonanza	3 Nov 67	0	S McAllen, Tex. USA. 6 1/2" broke off blade, left propeller. Ref: NTSB file 3-4241.
F64 Beech N35 Bonanza	13 Nov 67	1	D Camden, Ark. USA. Both control bolts of propeller hub. Ref: NTSB file 2-0931
F65 Snow S-2A	15 Nov 67	1	D Dateland, Ariz. USA. Propeller blade. Ref: NTSB file 2-1006
F66 Beech V-35 Bonanza	17 Jan 68	0	S Dell Rapids, S.Dak. USA. Propeller cylinder attach screws. Ref: NTSB file 3-0680.
F67 Cessna 206	8 Feb 68	0	D E. Prairie, Miss. USA. Crankshaft imbalance caused prop failure. Ref: NTSB file 3-4758.
F68 Cessna P206A	12 Feb 68	0	S Fort Madison, Iowa. USA. Propeller hub. Ref: NTSB file 3-3447.
F69 Mooney M-20C	24 Apr 68	0	D Hillsboro, Kansas USA. 18 in. of propeller blade separated. Ref: NTSB file 3-0916.
F70 Cessna 336 Skymaster	4 Jul 68	0	S Finlay Forks, B.C. Canada Rear propeller blade. Ref: NTSB file 6-0091.

**F-6
PROPELLER (FIXED-WING)**

F71	Pitts Special	21 Jul 68	1	D Arco, Id. USA. Propeller blade separated 18 in. from tip. Ref: NTSB file 3-3929
F72	Mooney M-20E	28 Jul 68	0	S Jackson, La. USA. Propeller blade across shank. NTSB file 3-4283
F73	Piper PA-25 Pawnee	7 Sep 68	0	S St. Joseph, La. USA. Propeller at station 29. NTSB file 3-3065.
F74	Cessna 210C	11 Sep 68	0	S Patricia, Tex. USA. Propeller blade failed approx. 5" from tip. Ref: NTSB file 3-4872.
F75	Cessna 150F	23 Oct 68	0	S Bedford, Mass. USA. 4" missing from tip of blade. NTSB file 3-4329.
F76	Cessna 310B	27 Oct 68	0	S Zanesville, Ohio. USA. Blade of left propeller at hub spider. Ref: NTSB file 3-3782.
F77	Boeing A75N1 Stearman	11 Jul 69	0	S West Point, Miss. USA. 16" of blade separated. Ref: NTSB file 3-1930.
F78	Boeing 75 Stearman	16 Jul 69	0	S Hilmar, Cal. USA. Propeller. Ref: NTSB file 3-3203.
F79	Meyers 200A	2 Aug 69	0	S Vacaville, Cal. USA. Propeller came off, 4 prop hub bolts evidenced prior damage. Ref: NTSB file 3-2518.
F80	Piper PA-28 Cherokee	10 Aug 69	1	D Los Angeles, Calif. USA. 16 in. of one propeller blade broke off. Ref: NTSB file 3-2645
F81	Cessna 150F	11 Aug 69	0	S Louisville, Miss. USA. Spinner bulkhead. Ref: NTSB file 3-3367.
F82	Boeing 75 Stearman	16 Aug 69	0	S Los Banos, Cal. USA. Blade broke 5" from butt end. NTSB file 3-3504.
F83	Mooney M-20B	16 Aug 69	0	D Quitman, Ark. USA. Propeller blade. Ref: NTSB file 3-3545.
F84	Barrett Cassut	28 Aug 69	1	D McCordsville, Indiana USA. Propeller. Ref: NTSB file 3-3801.
F85	Beech K35 Bonanza	5 Sep 69	4	D Provo, Utah USA. Propeller pitch-control bolts. NTSB file 3-2982
F86	Piper PA-30-160 Twin Commande	24 Nov 69	1	D Dandaloo, N.S.W., Australia. Most of propeller blade separated. Origin: corrosion in balancing cavity. Australia DoT
F87	Cessna 180C	1970	0	S Parkes, NSW, Australia. 9 in. of prop blade shed (nick). Ref: Australia

F-7
PROPELLER (FIXED-WING)

F88 Cessna 180	29 Jun 70	0	S Bumpy Lake, Ont. Canada. Propeller. Ref: MoT Canada file C00070.
F89 Cessna 172K	8 Aug 70	0	S Homer, La. USA. Approx. 6" propeller tip missing (blade nick). Ref: NTSB file 3-3398.
F90 Mooney M-20E	3 Oct 70	0	S Enterprise, Kans. USA. Blade failed 3" outboard of hub flange. Ref: NTSB file 3-2471.
F91 Mooney M-20E	26 Oct 70	0	S Chugwater, Wy. USA. Propeller blade, 3" from hub. NTSB file 3-4105.
F92 Piper J-3	6 Feb 71	0	S Portage La Prairie, Man. Canada. Propeller. Ref: MoT Canada file C10009.
F93 Piper PA-28 Cherokee	11 Apr 71	0	S Elmira, Cal. USA. # 1 blade 19" from tip. AD not complied with. Ref: NTSB file 3-0343.
F94 Cessna 172	1 May 71	0	S Beaver Falls, Pa. USA. Prop blade near tip. NTSB file 3-1301.
F95 American AA-1 Yankee	2 May 71	0	S Fort Myers, Fla. USA. 5 1/8" prop blade missing. NTSB file 3-1526.
F96 Fletcher FU-24-950	10 May 71	0	S Capr Runaway, New Zealand. Pitch-change actuating pin of propeller blade (root radius). Ref: NZ brief 71-048.
F97 Owl Racer 65-2	31 May 71	1	D Greenwich Reach, England. Half a prop blade shed, tearing out engine. Origin: corrosion pit. Ref: FI 6 June 74 p 741
F98 Aero Commander 500B	21 Jun 71	0	S Crossett, Ark. USA. Right prop hub spider. NTSB file 3-2073.
F99 Piper PA-28R Cherokee	30 Jun 71	0	S Carrollton, Ky. USA. Prop blade, 4" from tip. Ref: NTSB file 3-2286
F100 Snow S-2D	4 Aug 71	0	S Moana, New Zealand. 7 inches of blade shed (stone damage). Ref: NZ brief 71-070.
F101 Piper PA-30 Twin Commanche	6 Aug 71	0	S Bloomington, Ill. USA. Left prop blade near hub. Ref: NTSB file 3-2891
F102 Aero Commander 500B	18 Aug 71	0	S Newport, R.I. USA. Left prop blade (hub clamp). NTSB file 3-3264.
F103 Mustang L-2	12 Sep 71	1	S Indio, Calif. USA Propeller unapproved for engine installation, blade separated. NTSB file 3-1860.

F-8
PROPELLER (FIXED-WING)

F104 Boeing A75 Stearman	10 Nov 71	0	S Holtville, Cal. USA. Piece of prop blade shed. NTSB file 3-4428.
F105 Beech 99A Airliner (Frontier)	24 Nov 71	0	S Greeley, Colo. USA. Right prop blade failed (improper machining in balance hole cavity). Ref: NTSB file 1-0026.
F106 Cessna 185	1972	0	S Albany, WA, Australia. Propeller detached. Ref: Australia DoT.
F107 Cessna 120	13 Feb 72	0	S Beaumont, Kans. USA. Propeller blade. Ref: NTSB file 3-2029.
F108 Transavia PL-12 Airtruk	3 Mar 72	0	S Roydon Downs, New Zealand. Propeller hub. Ref: NZ brief 72-033.
F109 Beech 95 Travel Air	5 Apr 72	1	D Miami, Fla. USA. Right prop blade failed 1 inch from base of shank. Ref: NTSB file 3-0689
F110 Beech M35 Bonanza	12 May 72	1	D Florissant, Mo. USA. Prop pitch-change bolts. NTSB file 3-0956.
F111 Cessna P206	16 May 72	0	S Fremont, Cal. USA. Blade separated, crankshaft sheared at mounting flange. Ref: NTSB file 3-0176.
F112 Cessna P206	18 May 72	0	S Huntington Beach, Cal. USA. Propeller blade. Ref: NTSB file 3-3953.
F113 Transavia PL-12 Airtruk	26 May 72	0	S Wainui, New Zealand. Propeller blade (thread). Ref: NZ brief 76-053
F114 Cessna 310J	22 Aug 72	0	S Wichita Falls, Tex. USA. Propeller blade. Ref: NTSB file 3-3023.
F115 Cessna 172	29 Sep 72	0	S Clinton, Mich. USA. Propeller blade. Ref: NTSB file 3-3593.
F116 Cessna 185E (floats)	5 Oct 72	0	S Keswick, Ont. Canada. Propeller blade actuating pin (incorrect washer installed). Ref: MoT Canada file 020095.
F117 American AAI-A	30 Dec 72	0	S Show Low, Ariz. USA. Propeller blade. Ref: NTSB file 3-4002.
F118 Cessna A188-A	1973	0	S Wee Waa, NSW, Australia. Propeller hub. Ref: Australia DoT.
F119 Piper PA 28-180 Cherokee	1973	0	S Warwick Qld. Australia. 6 inches of prop blade shed (stone damage) Ref: Australia DoT.
F120 Fletcher FU-24	3 Apr 73	0	S Waotu, New Zealand. Propeller at blade root. Ref: NZ brief 73-073.

F121 Cessna 172K	6 Apr 73	0	S Oceanside, Cal. USA. Propeller blade (8" from tip). NTSB file 3-1106.
F122 Aero Commander 500B	1 Jun 73	0	S Crownpoint, N. Mex. USA. Propeller: blade retention mechanism. Ref: NTSB file 3-2512.
F123 Aero Commander 100	8 Jun 73	0	S Albany, N.Y. USA. Propeller blade (7" from tip). NTSB file 3-1318.
F124 Cessna 310I	18 Aug 73	0	S Miami, Fla. USA. Propeller (hub bolt holes). Ref: NTSB file 3-3833
F125 Cessna 206	9 Sep 73	0	S East Boston, Mass. USA. Propeller hub. Ref: NTSB file 3-3663.
F126 Piper PA-31 Navajo	25 Sep 73	0	S Roswell, N. Mex. USA. 1 ft of right prop blade shed. NTSB file 3-3054
F127 Cessna 206F	3 Nov 73	0	S Nagoya, Japan. Screw parts of #2 prop blade. Ref: Japan MoT.
F128 Mooney M-20A	12 Nov 73	1	D Innisfree, Alta. Canada. Propeller. Ref: MoT Canada file W30093.
F129 Meyers 200B	14 Nov 73	0	S Savannah, Ga. USA. Propeller (origin: root of top outboard thread) Ref: NTSB file 3-3994.
F130 Cessna 210-5A	1974	0	S Morwell, Vict. Australia. Propeller blade shed. Ref: Australia DoT.
F131 Beech 95-B55 Baron	29 Jan 74	0	S Goodyear, Ariz. USA. Propeller hub. Ref: NTSB file 3-0266.
F132 Piper PA-32 Cherokee SIX	29 Mar 74	0	S Minto, Alas. USA. Propeller (pitch change dowel). Ref: NTSB file 3-3770.
F133 Mooney M-20E	20 Jul 74	2	D Custer, S. Dakota USA. Propeller blade (shot-peened area). Ref: NTSB file 3-4198
F134 Beech 35 Bonanza	24 Jul 74	0	S Bellevue, Tex. USA. Propeller blade (near blade shank). Ref: NTSB file 3-4334.
F135 Cessna 150	28 Jul 74	0	S Erin, Ont. Canada. Propeller. Ref: MoT Canada file 040093.
F136 Cessna 210K	18 Aug 74	0	D Joy, Ky. USA. Propeller blade. Ref: NTSB file 3-3004.
F137 Globe GC-1B	20 Aug 74	1	S Manchester, Tenn. USA. Propeller hub, 21 inches from clamp assembly strap. Ref: NTSB file 3-3030

F-10
PROPELLER (FIXED-WING)

F138 Mooney M-20C	25 Aug 74	0 S Stanfield, Ariz. USA. Propeller blade. Ref: NTSB file 3-2798.
F139 CallAir A-9	5 Sep 74	0 D Amarillo, Texas USA. Propeller blade. Role: crop spraying. Ref: NTSB file 3-2865.
F140 Boeing A75 Stearman	27 Sep 74	0 S Dos Palos, Cal. USA. Propeller blade (3" from butt end). Ref: NTSB file 3-2834.
F141 Beech E18S	7 Oct 74	0 S Topeka, Kans. USA. Prop failure, right engine (wrong crankshaft counterweight combination installed). Ref: NTSB file 3-4284.
F142 Cessna 182	28 Nov 74	0 S Lewiston, Id. USA. Propeller separated. Ref: NTSB file 3-4323.
F143 Fuji FA 200- 180 Aero Subaru	6 Mar 75	0 S Hokkaido, Japan. Screw parts of #2 prop hub. Ref: Japan MoT.
F144 Cessna 180	25 Apr 75	0 S Jackson, Wy. USA. Propeller blade (at tip). Blade shortened 1". File marks on blade. Ref: NTSB file 3-1329.
F145 Cessna A188A	15 May 75	0 S Merced, Cal. USA. Propeller hub. Ref: NTSB file 3-1130.
F146 Aero Commander 100	24 May 75	0 S Stowe, Vt. USA. Part of prop blade shed. NTSB file 3-3896.
F147 Grumman American AA-1B	25 May 75	0 S Tampa, Fla. USA. 4" blade tip shed (pits). NTSB file 3-1526.
F148 Piper PA-18 Super Cub	31 May 75	0 S Carp, Ont. Canada. Propeller blade tip shed (nick or pit on leading edge). Ref: MoT Canada file 050041.
F149 Cessna 185	24 Jun 75	0 S Churchill, Man. Canada. Propeller (severe dent on leading edge). Ref: MoT Canada file C50075.
F150 Boeing A75L3 Stearman	26 Jun 75	0 S Hickman, Cal. USA. Blade separated 5" from butt end. Ref: NTSB file 3-1599.
F151 Beech J35 Bonanza	1 Jul 75	0 S Sparta, Ky. USA. Prop blade pitch control bolts. NTSB file 3-2669.
F152 Piper PA-28 Cherokee	6 Jul 75	0 S Weston, W.V. USA. Lost 22" of blade. Ref: NTSB file 3-2192.
F153 de Havilland D.H.114 Heron	11 Jul 75	0 S San Juan, Puerto Rico. Propeller blade. Ref: NTSB file 3-1773.

F154 Cessna 177 Cardinal	18 Jul 75	0	D Cambridge Narrows, N.B. Canada. Several inches of prop shed (nick). Ref: MoT Canada file A50028.
F155 Cessna 177B	20 Jul 75	0	S Aledo, Ill. USA. Propeller at file marks repairing previous damage. Ref: NTSB file 3-3972.
F156 Cessna 207	10 Aug 75	0	S Topeka, Kans. USA. Propeller hub. Ref: NTSB file 3-3981.
F157 Socata 894A Rallye Minerva	26 Sep 75	0	S Hamm-Lippewiesen, W. Germany. Adjustment fork broken in hydraulic pitch control system for propeller. Ref: W. German file 3X0446.
F158 Piper PA-32 Cherokee SIX	14 Oct 75	0	D South Boston, Va. USA. Propeller blade pitch-change dowel failed, propeller failure. Ref: NTSB file 3-3555.
F159 Aero Commander 112A	5 Nov 75	0	D McFarland, Calif. USA. About 6 inches of propeller separated. Ref: NTSB file 3-3351.
F160 Fuji FA 200- 160 Aero Subaru	10 Nov 75	0	S Oita, Japan. Prop blade (stone pit at back side). Ref: Japan
F161 Beech A23A Musketeer	1976	1	D Australia. Most of prop blade shed. Ref: Australia DOT.
F162 Mooney M-20C	24 Jan 76	0	S Fontana, Cal. USA. Propeller hub (blade socket retention threads). Ref: NTSB file 3-1564.
F163 Cessna 310J	29 Jan 76	0	S Lubbock, Tex. USA. Blade separated from hub, right engine. Ref: NTSB file 3-2580.
F164 Beech V35 Bonanza	30 Jan 76	2	D Meigs, Ga. USA. No. 2 prop blade actuating pin. Ref: NTSB file 3-0631
F165 Douglas DC-6 (Mercer Airlines)	8 Feb 76	3	D Van Nuys, Calif. USA. Propeller blade. Leading edge under de-icer boot. Ref: NTSB-AAR-76-17
F166 Transavia PL-12 Airtruk	18 Feb 76	0	S Matahiwi, New Zealand. Propeller blade. Ref: NZ brief 76-029
F167 Piper PA-28R Cherokee	22 Feb 76	0	S Little Rock, Ark. USA. 6 prop bolts failed. Ref: NTSB file 3-0825.
F168 Cessna 336 Skymaster	11 Mar 76	4	D McGregor, Iowa USA. Propeller separated. Ref: NTSB file 3-1960.

F-12
PROPELLER (FIXED-WING)

F169 American AA-1B	27 Apr 76	0	S Gorman, Cal. USA. Propeller (nick). Ref: NTSB file 3-1444.
F170 Cessna 337	4 May 76	0	S Barrow, Alas. USA. Rear prop dowel pin on pitch change mechanism. Ref: NTSB file 3-1332.
F171 Cessna 182	27 May 76	0	S Vallejo, Cal. USA. Propeller blade (last thread in hub). Ref: NTSB file 3-1459.
F172 N. American Commander 500	12 Jul 76	0	S Kamloops, B.C. Canada. Right propeller blade shed (corrosion pits). Ref: MoT Canada file P60037.
F173 Piper PA-23 Aztec	16 Aug 76	0	S Miami, Fla. USA. Propeller separated. Ref: NTSB file 3-4111.
F174 Cessna 310L	21 Aug 76	0	S Carpenter, S.D. USA. Engine counterweight dampers out of tolerance. Engine mount structure bent. Fatigued prop hub. Ref: NTSB file 3-3557.
F175 Piper PA-23 Aztec	15 Sep 76	0	D Independence, Mo. USA. 3 propeller mounting studs. NTSB file 3-4081.
F176 Boeing A75 Stearman	18 Sep 76	1	D Parlier, Calif. USA. Propeller blade broke 5 in. from butt. Role aerial application. Ref: NTSB file 3-2535
F177 Cesana 182M	24 Nov 76	0	S Grain Valley, Mo. USA. Propeller blade separated from hub (threaded area). Ref: NTSB file 3-3674.
F178 N. American Rockwell 112	31 Dec 76	0	S Wildorado, Tex. USA. Propeller blade. Ref: NTSB file 3-4181.
F179 Britten- Norman BN2A-8 Trislander	14 Jan 77	0	S St. Thomas, Virgin Islands. Propeller blade. Ref: NTSB file 3-1856.
F180 Piper PA-28R Cherokee	9 Mar 77	0	S Petal, Miss. USA. Propeller blade. Ref: NTSB file 3-4122.
F181 Beech 95-C55 Baron	25 Mar 77	0	S Mackay Qld., Australia. Propeller hub. 100 hr check not done. Ref: Australia DoT.
F182 Beech T-42A Cochise (US Army)	25 May 77	0	D Al. USA. No. 1 propeller hub assembly. Ref: US Army
F183 Grumman TBM-3E Avenger	9 Jun 77	0	D L'Isle-Sainte-Viviane, N.B. Canada. Propeller blade (corrosion-induced fatigue). Ref: MoT Canada file A70014.

F184 Beech 23 Sundowner	25 Jun 77	0	S Matane, Que. Canada. Prop blade failed 9" from end (undressed dent on leading edge). Ref: MoT Canada file Q70060.
F185 Volpar H18	20 Jul 77	0	S Galena, Alas. USA. Propeller pitch changing mechanism. Ref: NTSB file 3-3400.
F186 Champion 7FC	20 Aug 77	0	S Moline, Ill. USA. Propeller blade. Ref: NTSB file 3-2989.
F187 Cessna 182	18 Sep 77	0	S Granite City, Ill. USA. Two 5th order dampers on crankshaft caused imbalance. Propeller separated. NTSB file 3-3706
F188 Beech E18S	1 Oct 77	0	D Plymouth, In. USA. Propeller (nick). Ref: NTSB file 3-4251.
F189 Waco UPF-7	29 Oct 77	2	D Palmyra, NY. USA. 13 in. of propeller blade separated. Ref: NTSB file 3-3831
F190 Piper PA 28-180 Cherokee	1978	0	S Glen Innes, NSW, Australia. Prop blade. Ref: Australia DoT.
F191 Beech S35 Bonanza	19 Mar 78	4	D Carrabassett, Maine USA. 6 inches of propeller blade separated. Ref: NTSB file 3-1869
F192 Aero Commander 500	4 Apr 78	0	S Miami, Fla. USA. Left propeller blade separated. NTSB file 3-1097.
F193 Cessna 336	24 Apr 78	0	S Gisborne, New Zealand. Prop hub and retaining nut failed from fatigue. Ref: NZ brief 78-063.
F194 Aero Commander S-2R	28 Apr 78	0	S Stringtown, Ms. USA. Propeller blade. Ref: NTSB file 3-1236.
F195 Cessna 210K	28 Apr 78	0	S Corona, N.M. USA. Propeller blade separated. Blades had previous damage straightened. Ref: NTSB file 3-1549.
F196 Piper PA 28R-180 Cherokee	5 May 78	0	S Ehime Pref., Japan. Oil line tube assembly of propeller governor (stress concentration). Ref: Japan MoT.
F197 Piper PA-28 Cherokee	8 May 78	0	S Royalton, N.Y. USA. Propeller blade. Ref: NTSB file 3-3335.
F198 Grumman G-164 AgCat	23 May 78	0	S Iowa, La. USA. 18 inches missing from blade. NTSB file 3-1166
F199 Beech V35 Bonanza	4 Jun 78	0	S East Jordan, Mich. USA. No. 2 blade actuating pin. Ref: NTSB file 3-1670.

F-14
PROPELLER (FIXED-WING)

F200	Mooney M-20C	6 Jun 78	0	S	Bennett, Col. USA. Propeller at indentation on edge of blade. Ref: NTSB file 3-1807.
F201	Beech V35 Bonanza	11 Jun 78	0	S	Jackson Hole, Wy. USA. Prop. AD not complied with. NTSB file 3-4450.
F202	Cessna 177	2 Aug 78	0	S	Eagle River, Wis. USA. Propeller blade (gouge 8" from tip). Ref: NTSB file 3-4292.
F203	Cessna 172L	6 Aug 78	0	S	Skwentna, Ak. USA. Propeller blade. Ref: NTSB file 3-3055.
F204	Cessna 182C	10 Sep 78	0	S	Hudson, N.Y. USA. Propeller blade actuating link elongated, failed in fatigue. NTSB file 3-3339
F205	Piper PA-18A Super Cub	7 Dec 78	0	S	Cooper Landing, Ak. USA. Propeller blade. Ref: NTSB file 3-3533.
F206	Piper PA-28 Cherokee	22 Dec 78	4	D	Kennett, Mo. USA. Propeller separated. Ref: NTSB file 3-4239
F207	Midget Mustang	27 Dec 78	0	S	Prescott, Ariz. USA. 13" of # 1 blade shed (dent in leading edge). Ref: NTSB file 3-4326.
F208	Piper PA-31 Navajo	26 Jan 79	0	S	Lima, N.Y. USA. Right propeller blade tip. NTSB file 3-0280.
F209	de Havilland DHC-6 Twin Otter	27 Feb 79	0	S	Cheyenne, Wy. USA. Propeller system: control unit, PCV - fatigue fracture. Ref: NTSB file 3-2477.
F210	Thorp T-18 Tiger	11 May 79	0	D	Zillah, Wa. USA. Propeller blade. Ref: NTSB file 3-1034
F211	Rockwell Thrush Commander	2 Jun 79	0	S	Lottery, Jamaica. Propeller blade. Ref: Jamaica.
F212	Cessna 150	6 Jul 79	0	S	Milwaukee, Wis. USA. Propeller missing 5" of blade tip. Ref: NTSB file 3-2300.
F213	Piper PA-28 Cherokee Cruiser	16 Aug 79	2	D	Wildwood, Alta. Canada. 5 inches of prop blade separated. Crack in blade previously repaired by removal of material, but incipient crack remained. Ref: MoT file 79-W0071.
F214	Cessna 180 Skywagon	19 Aug 79	0	S	Atlin Lake, B.C. Canada. Blade broke at hub attachment (threads). Ref: MoT Canada file P90073.

F215 Cessna A188A AGwagon	5 Nov 79	0	S Stratford, New Zealand. Threaded shank of prop. Ref: NZ brief 79-124.
F216 Cessna 150	1980	0	S Wiluna, WA, Australia. 14 cm of prop blade shed (stone damage). Ref: Australia DoT.
F217 Piper PA 23-250 Aztec	4 Feb 80	0	S Williams Lake, B.C. Canada. Propeller hub spider arm. (lack of grease). Ref: MoT Canada file P00005.
F218 Cessna 150 Super	23 Feb 80	0	S Joensuu Airport, Finland. Propeller blade. Ref: Finland BoA.
F219 Cessna 185 Skywagon	23 Mar 80	0	S Dawson City, Y.T. Canada. 30" of blade shed (nick). Ref: MoT Canada file W00026.
F220 Bucker Jung BU-131	4 May 80	0	S Colwich, Ks. USA. Fatigue fracture of prop. Corrosion discoloration present. Ref: NTSB file 3-1205.
F221 Beech 95-B55 Baron	17 Jul 80	0	S Malden, Mo. USA. Hartzell prop hub clamp. Ref: NTSB file 3-3231.
F222 Beech F33A Bonanza	1 Oct 80	0	S Arlington, Az. USA. Propeller blade. Ref: NTSB file 3-2540.
F223 Mooney M-20C	16 Oct 80	0	S Willcox, Az. USA. 21" of blade shed (possible high stress from blade straightening). Ref: NTSB file 3-3701.
F224 Piper PA-32 Cherokee SIX	1 Nov 80	0	S Carlsbad, N.M. USA. 8 inches of propeller shed (origin: nick). Ref: NTSB file 3-3686.
F225 Mitsubishi MU-2J	30 Nov 80	0	D Port Aransas, Tex. USA. Prop blade. Origin: stress corrosion crack. Ref: NTSB file 3-3557.
F226 Cessna A188B	1981	0	S Naradhan, NSW, Australia. Propelle: shaft. Ref: Australia DoT.
F227 Cessna 206	3 Mar 81	0	S Lae, Papua New Guinea. Propeller blade. Ref: Papua New Guinea
F228 Cessna 172P	1 Jul 81	0	S Thief River Falls, Mn. USA. Propeller failed 12" from hub centre line (trailing edge nick). Ref: NTSB file 3-1521.
F229 Cessna P206A	28 Jul 81	0	S Marathon, Fl. USA. McCauley hub separated. Dynamic dampener beyond limits. Ref: NTSB file 3-2183.

F-16
PROPELLER (FIXED-WING)

F230 Cessna A188B 7 Aug 81 O D Bastrop, La. USA.
McCauley prop hub. Inadequate inspection. Ref:
NTSB file 3-1975.

F231 Piper PA-24 29 Aug 81 O S Sacramento, Ca. USA.
Commanche Propeller blade. Ref: NTSB file 3-2334.

F232 Beech 58 27 Oct 81 O S Selma, Al. USA.
Baron McCauley prop hub. Ref: NTSB file 3-2047.

Total Fatalities: 162

* APPENDIX G *
* *****
* FIXED-WING AIRCRAFT - LANDING GEAR *

ID No.	Aircraft Type	Accident Date	No. a Dead m	D	Remarks
G1	Handley Page H.P. 50 Heyford Mk. 1 (RAF)	10 Jun 32	? ?	Upper Heyford, UK. Starboard outer end of lower centre-section front spar failed (fatigue), causing right undercarriage to collapse. Ref: Barnes, HANDLEY PAGE AIRCRAFT SINCE 1909, p 297.	
G2	US medium patrol bomber (tail-wheel) (USAAC)	Oct 42	? ?	Failure in torque scissors fitting welded to outer cylinder of main gear shock strut (Bendix). Weld between fitting & cylinder barrel. Ref: MacLean, AERONAUTICAL ENG. REVIEW, Nov/45, p 12.	
G3	US medium patrol bomber (tail-wheel) (USAAC)	WW II	? ?	Failure in drag brace strut fitting on outer cylinder of main gear shock strut (Bendix). Ref: MacLean, AERONAUTICAL ENG. REVIEW, Nov/45, p 16.	
G4	N. American B-24 Liberator (USAAC)	1944	? ? ?	Nose gear failure. Ref: Boggs, AFFDL TR-79-3071 p 132; Boggs in ASTM STP 613, p 5.	
G5	Convair B-36 (USAF)	1953-59	? ? ?	Starboard landing gear (threads). Ref: J.D. Caldara, pp 10, 23 & 24 in WADC TR 59-507, 1959	
G6	Vickers Viscount (BEAC)	12 Dec 54	0 S	Blackbushe Airport, UK. Back-stay bracket of right gear. Ref: WAAS p 21/54.	
G7	Vickers Viscount (TAA)	30 Apr 57	0 S	Townsland, Qld. Australia. Trunnion block. Nose gear actuating jack disconnected from strut. Ref: WAAS p 7/57.	
G8	Lockheed L-749 (Eastern)	18 Dec 58	0 S	Atlanta, Ga. USA. Lower drag strut terminal of right main gear. Ref: WAAS p 22/58.	
G9	Lockheed L-1049 (TWA)	17 Jan 59	0 S	Olathe, Kan. USA. Landing gear down-lock strut. Ref: USACAD.	
G10	Douglas DC-3 (Allegheny)	22 Jan 59	0 S	Huntington, WV USA. Centre wing to drag strut attach fitting, at lower attach bolt holes. Ref: WAAS p 3/59.	

G-2

LANDING GEAR (FIXED-WING)

- G11 Vickers 3 Apr 59 0 S Detroit, Mich. USA.
Viscount 700D Distortion of landing gear uplock lever due to fatigue cracks. Ref: USACAD
- G12 Cessna 180 24 Apr 59 0 S Martin Lake, Sask. Canada.
(on skis) Right gear leg at bolt holes. (Spring steel).
Ref: MoT Canada file 635.
- G13 Cessna 180 13 May 59 0 S Point Barrow, Alaska USA.
(wheel-ski) Starboard landing gear strut at bolt holes at wheel attachment end. Ref: USACAD.
- G14 Boeing 707 12 Jul 59 0 S New York, USA.
(PAWA) 2 front wheels of left main gear separated.
Origin: peen mark made by contact between truck beam & anti-rotation bolt. Ref: WAAS p 13/59
- G15 Cessna 180 31 Aug 59 0 S Athabasca, Alta. Canada.
Right gear leg at two top bolt holes. Ref: MoT Canada file 770.
- G16 Curtiss 9 Sep 59 0 S Dallas, Tex. USA.
C-46F Front spar attachment fittings of right gear
(Zantop) (bolt hole). Ref: WAAS p 17/59.
- G17 Cessna 180 9 Dec 59 0 S Beaverhill Lake, Man. Canada.
(on skis) Right gear leg at top two bolt holes where ski axle is attached. Ref: MoT Canada file 859.
- G18 Douglas DC-3 23 Dec 59 0 S Tyler, Tex. USA.
(Trans Texas) Brace strut of right gear. Ref: WAAS p 25/59
- G19 Lockheed 3 Jan 60 0 S Philadelphia Pa. USA.
L-749 (Eastern) Right gear strut cylinder. Ref: USACAD.
- G20 Lockheed 4 Jan 60 0 S Washington, D.C. USA.
L-749 (Eastern) Right gear strut cylinder. Ref: USACAD.
- G21 Martin 4-0-4 28 Feb 60 0 S Olathe Kan. USA.
(TW) Left main gear gland nut. Ref: USACAD.
- G22 Lockheed 29 Feb 60 0 S Chicago, Ill. USA.
L-1049G (TW) Drag strut of right main gear. Ref: USACAD
- G23 Airspeed 3 Mar 60 0 S Woolsington Airport, UK.
Ambassador Port landing gear down-lock latch plate.
(BKS) Ref: WAAS p. 8/60.
- G24 Douglas DC-3 13 Aug 60 0 S Madison, Wis. USA.
(North Central) Strut brace fitting of left gear. Ref: USACAD.
- G25 Bristol 11 Nov 60 0 S Khartoum, Sudan.
Britannia Support member for starboard main gear uplock.
(BOAC) Ref: WAAS p. 26/60.

G26 Cessna 180	24 Nov 60	0 S	Wheatcroft Lake, Man. Canada. Left gear leg (upper two bolt holes). Ref: MoT Canada file 1178.
G27 Cessna 170A	9 Jan 61	0 S	St. Francois de Montmagny, Que. Canada. Right gear leg (2 top axle attachment holes). Spring steel. Ref: MoT Canada file 1227.
G28 Fokker F-27 (Piedmont)	17 Feb 61	0 S	Goldsboro, N.C. USA. Upper drag strut hinge pin bolt (right gear). Ref: WAAS p. 4/61.
G29 Curtiss C-46F	10 Mar 61	0 S	St. Louis, Mo. USA. Left main gear, drag link assembly. Ref: WAAS p. 5/61.
G30 Cessna 150	2 Jun 61	0 S	Vancouver, B.C. Canada. Left gear leg (steel) 8 inches from fuselage attachment. Fretting. Ref: MoT Canada file 1332
G31 Douglas DC-6B (PAA)	26 Jun 61	0 S	Miami, USA. Landing gear uplatch release cable. Ref: WAAS p. 13/61.
G32 Lockheed L-1049G Super Constellation (Eastern)	3 Aug 61	0 D	New York, N.Y. USA. Upper cap weld of right landing gear shock strut cylinder. Ref: Lowell, "Airline Safety is a Myth"
G33 Cessna 180	8 Dec 61	0 S	Red Lake, Ont. Canada. Right gear leg (2 upper bolt holes). Ref: MoT Canada file 1543.
G34 Norseman IV	28 Feb 62	0 S	Mellersh Pt., B.C. Canada. Fitting socket of right float strut attachment. Ref: MOT Canada file 1604.
G35 Douglas DC-3	5 Mar 62	0 S	Sugluk, Que. Canada. Upper truss of right main undercarriage near front gusset. Ref: MOT Canada file 1607.
G36 Douglas DC-6 (Eastern)	7 Mar 62	0 S	Buffalo, NY. USA. Right main-gear oleo strut. Ref: WAAS p. 6/62
G37 Lockheed L-1049 (Eastern)	28 May 62	0 S	New York, USA. Bolt attaching nose gear to drag strut. Ref: WAAS p. 14/62.
G38 Curtiss C-46 (Riddle)	5 Jun 62	0 S	San Juan, Puerto Rico. Side brace, left main gear, improper machining. Ref: WAAS p. 14/62
G39 Armstrong Whitworth Argosy (Capitol)	2 Jul 62	0 S	Wilmington, Del. USA. Lower attach fitting of right gear drag strut. Ref: WAAS p. 16/62.

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LANDING GEAR (FIXED-WING)

- G40 Douglas 12 Mar 63 0 S Boston, Mass. USA.
DC-7B Right main l/g shock strut cylinder at fillet
(Eastern) of torque link lugs. Ref: USACAD.
- G41 Curtiss C-46 5 Sep 63 0 S Anchorage, Alaska USA.
(Cordova) Hydraulic pressure line, external ground service fitting, right gear. Ref: USACAD.
- G42 Convair 440 1 Nov 63 0 S Atlanta, Ga. USA.
(Delta) Wheel axle of left main gear. Origin: fillet at flange. Ref: WAAS p. 20/63.
- G43 Curtiss 1 Jan 64 0 S Hill AFB, Ut. USA.
C-46A Main landing gear. Ref: NTSB file 1-0008.
- G44 Douglas C-47 11 Jan 64 0 S Porto Alegre, Brazil.
(Varig) Starboard landing gear. Ref: WAAS p. 2/64.
- G45 Cessna 140 9 Feb 64 0 D Gainesville, Florida USA.
Fracture at step plate bolt hole of main gear.
NTSB file 3-0320
- G46 Cessna 182 22 Feb 64 0 S Napa, Cal. USA.
Nose wheel fork. Ref: NTSB file 3-0448.
- G47 Cessna 180 24 Feb 64 0 S Red Bay, Lab. Canada.
Left spring leg at upper bolt holes.
Ref: MOT Canada file 2200.
- G48 Cessna 170 1 Mar 64 0 S Oklahoma City, Okla. USA.
Gear collapsed. Ref: NTSB file 3-0524.
- G49 Lockheed 749 9 Mar 64 0 S Boston, Mass. USA.
Constellation Stress corrosion and fatigue failure of nose
(TWA) gear actuating strut piston rod end clevis.
Ref: WAAS p. 7/6'.
- G50 Sud Aviation 17 Mar 64 0 S Copenhagen, Denmark.
Caravelle (SAS) Nose wheel axle (steel). Ref: WAAS p. 8/64.
- G51 de Havilland 22 Mar 64 0 D Singapore.
Comet 4 Right landing gear main forging at gear leg.
(Malaysian Airways) Ref: WAAS p. 9/64
- G52 de Havilland 25 Mar 64 0 S Hilo, Hawaii. USA.
104-5 Dove Main gear collapsed. Ref: NTSB file 3-0702.
- G53 Cessna 182 4 Apr 64 0 S Washington, D.C. USA.
Nosewheel shimmy damper support bracket. Ref:
NTSB file 3-0805.
- G54 Meyers 22 Apr 64 0 S Washington, D.C. USA.
200A Nose wheel fork broken. Ref: NTSB file 3-0999.

G55 Boeing B-17G	27 Apr 64	0 S Marana, Ariz. USA. Left gear drag strut terminal fitting. Ref: NTSB file 2-0257.
G56 Aero Commander 560	27 Apr 64	0 S Paducah, Ky. USA. Nose gear extension bolt. Ref: NTSB file 3-1062.
G57 Piper PA-25 Pawnee	28 Apr 64	0 S Terrell, Tex. USA. Main gear shock strut at lower end weld. Ref: NTSB file 3-1063.
G58 Cessna 150A	2 May 64	0 S Boca Raton, Fla. USA. Nose gear fork. Ref: NTSB file 3-1126.
G59 Cessna 182	9 May 64	0 S Northbrook, Ill. USA. Nose gear fork failed in radius of milled section at attach bolt. Ref: NTSB file 3-1211.
G60 Aero Commander 520	20 May 64	0 S Indianapolis, Ind. USA. Nosewheel torque knee scissors. NTSB file 3-1344.
G61 Cessna 172	22 May 64	0 S Alachua, Fla. USA. Nose wheel fork. Ref: NTSB file 3-1365.
G62 Beech 35 Bonanza	12 Jun 64	0 S Piedmont, Okla. USA. Nosegear retract actuator arm. NTSB file 3-1634.
G63 Mooney M-20	12 Jun 64	0 S Bucklin, Kans. USA. Landing gear handle. NTSB file 3-1636.
G64 Cessna 210	16 Jun 64	0 S Klamath Falls, Ore. USA. Nose gear hydraulic line assembly. Ref: NTSB file 3-1961.
G65 Piper PA-22	20 Jun 64	0 S Satanta, Kans. USA. Left gear shock strut (weld). NTSB file 3-1724.
G66 Navion G	1 Jul 64	0 S Des Moines, Iowa. USA. Nose wheel steering torque tube. Ref: NTSB file 3-1891.
G67 Grumman G-164 AgCat	8 Jul 64	0 S Port Lavaca, Tex. USA. Gear spring leg at axle attach bolt holes. Ref: Ref: NTSB file 3-1988.
G68 Piper PA-16 Clipper	17 Jul 64	0 S Clear, Alas. USA. Left front landing gear attach fitting. Ref: NTSB file 3-2101.
G69 Cessna 210	2 Aug 64	0 S St. Louis, Mo. USA. Piston rod of nose gear actuating hydraulic cylinder (threads). Ref: NTSB file 3-2299.
G70 Piper PA-24 Commanche	28 Aug 64	0 S Los Angeles, Cal. USA. Nose gear drag link clevis bolt. NTSB file 3-3833.

LANDING GEAR (FIXED-WING)

- G71 Cessna 180 29 Aug 64 0 S Aberdeen, Md. USA.
Right gear attach bolt. Ref: NTSB file 3-2674.
- G72 Cessna 182 30 Aug 64 0 S Flagstaff, Ariz. USA.
Nose wheel fork. Ref: NTSB file 3-2693.
- G73 Aero Commander 520 30 Aug 64 0 S Morristown, N.J. USA.
Nose wheel fork. Ref: NTSB file 3-2694.
- G74 Douglas C-47 8 Sep 64 0 S Idiris Airport, Libya.
(Libyan Aviation) Left-hand brace strut attach fitting. Ref: WAAS p. 20/64.
- G75 Culver V 9 Sep 64 0 S Pacoima, Cal. USA.
Right gear retract push-pull tube. Ref: NTSB file 3-2829.
- G76 Lockheed L-749 (TWA) 9 Sep 64 0 S Boston, Mass. USA.
Nose gear actuating strut. NTSB file 1-0021.
- G77 Cessna 140 11 Sep 64 0 S Chicago, Ill. USA.
Right gear strut at wedges. NTSB file 3-2860.
- G78 Beech 65-80 Queen Air 13 Sep 64 0 S Seward AFB, Tenn. USA.
Nose gear chain sprocket attach bolt. Ref: NTSB file 3-2894.
- G79 Howard DGA15P 20 Sep 64 0 D Deridder, La. USA.
Left gear attach fitting, main gear. Ref: NTSB file 3-2971.
- G80 Cessna 175 24 Sep 64 0 S Blackfoot, Id. USA.
Nose wheel fork cracked by previous damage.
Ref: NTSB file 3-3010.
- G81 Boeing E75 Stearman 7 Oct 64 0 S Bakersfield, Cal. USA.
Landing gear strut at upper sleeve. Ref: NTSB file 3-3144.
- G82 Cessna 182 18 Oct 64 0 S Cincinnati, Ohio. USA.
Old crack in failed area of nose wheel fork.
Ref: NTSB file 3-3244.
- G83 Cessna 140 20 Oct 64 0 S Horn Lake, Miss. USA.
Main gear (strut saddle showed old crack). Ref:
NTSB file 3-3266.
- G84 Piper PA-25 Pawnee 22 Oct 64 0 S Elmira, Cal. USA.
Both landing gear shock struts at lower attach
fittings. AD not complied with. Ref: NTSB file
3-3291.
- G85 Piper PA-24 Comanche 24 Oct 64 0 S Torrance, Cal. USA.
Nose gear drag link clevis broke (threads)
Ref: NTSB file 3-3301.

G86 Cessna 170	25 Oct 64	0	S Marshland, Neb. USA. Landing gear. Fatigue nucleus at radius - improper machining. Ref: NTSB file 3-3842.
G87 Boeing 720 (United)	5 Nov 64	0	S San Francisco, Cal. USA. Nose gear drag brace lockrod upper attach bolt. Ref: NTSB file 1-0079.
G88 Cessna 175	8 Nov 64	0	S Wilmington, Ohio. USA. Landing gear spring leaf broke (improper weld). Ref: NTSB file 3-3440.
G89 Canadair CL-44 (Flying Tiger)	12 Nov 64	0	S Detroit, Mich. USA. Left main gear uplock actuator cylinder. Ref: NTSB file 1-0061.
G90 Boeing 707-123B (American)	12 Nov 64	0	S Nashville, Tenn. USA. Nos. 5-6 axle section near inner bearing brake collar. 16,000 hrs on part. NTSB file 1-0053.
G91 Douglas DC-4 (Slick)	19 Nov 64	0	S Norfolk, Va. USA. Right nosewheel yoke end fitting. 5568 hours on part. Ref: NTSB file 1-0057.
G92 Cessna 150	22 Nov 64	0	S Agawam, Mass. USA. Left gear spring assembly. Ref: NTSB file 3-3543.
G93 Cessna 182	7 Dec 64	0	S Fayetteville, N.C. USA. Nose wheel fork. Ref: NTSB file 3-3621.
G94 Piper PA-24 Commander	10 Dec 64	0	S Philadelphia, Pa. USA. Nose gear drag link clevis (threads). Ref: NTSB file 3-3630.
G95 Douglas DC-8 (Eastern)	8 Jan 65	0	S San Juan, Puerto Rico. Right main landing gear axle beam. Service hours: 8943. Ref: NTSB file 1-0034.
G96 Beech M-23 Muskeeter	10 Jan 65	0	S Lombard, Ill. USA. Right landing gear strut. Ref: NTSB file 3-0402
G97 Piper PA-23 Aztec	13 Jan 65	0	S Wilkesboro, N.C. USA. Lower nose wheel drag link. Ref: NTSB file 3-0196
G98 Cessna 310	18 Jan 65	0	S Rochester, N.Y. USA. Nose gear lock torque tube. Ref: NTSB file 3-0112
G99 Cessna 140	24 Jan 65	0	S Fort Lauderdale, Fla. USA. Left main gear axle. Ref: NTSB file 3-0093
G100 Cessna 172	25 Jan 65	0	S Kansas City, Mo. USA. Nose wheel fork. Ref: NTSB file 3-0681.
G101 Mooney M-18L	30 Jan 65	0	S Pacoima, Cal. USA. Right main gear operating arm (weld). Ref: NTSB file 3-0540.

LANDING GEAR (FIXED-WING)

G102 Curtiss C-46 (Zantop)	8 Feb 65	0 S Atlanta, Ga. USA. Left landing gear. Ref: NTSB file 1-0015.
G103 Cessna 182G	17 Feb 65	0 S Syracuse, N.Y. USA. Nose gear torque link. Ref: NTSB file 3-0427.
G104 Champion 7FC Tri-Traveller	21 Feb 65	0 S Milton, Fla. USA. Nose gear fork. Ref: NTSB file 3-0673.
G105 Norseman V	26 Feb 65	0 S Big Trout Lake, Ont. Canada. Left gear axle housing at lower end of shock strut. Ref: MOT Canada file 2497.
G106 Cessna 172A	13 Mar 65	0 S Jacksonville, Ill. USA. Nose gear fork. Ref: NTSB file 3-0858.
G107 Cessna 172	26 Mar 65	0 S San Antonio, Tex. USA. Nose wheel fork. Ref: NTSB file 3-2124.
G108 Cessna 195A	13 Apr 65	0 S Madison, Wis. USA. Cross-wind wheel spindle pivot pin bolt (left gear). Ref: NTSB file 3-1926.
G109 Cessna 182	22 Apr 65	0 S Butte, Mont. USA. Nose wheel fork. Ref: NTSB file 3-3614.
G110 Cessna 180	7 May 65	0 S Tuktoyaktuk, NWT. Canada. Left spring leg at upper axle attachment holes. Ref: MOT Canada file 2542.
G111 Piper PA-22	8 May 65	0 S Paducah, Ky. USA. Nose gear support tubes. Ref: NTSB file 3-0790.
G112 Boeing 707-120 (American)	11 May 65	0 S El Paso, Tex. USA. No. 7 wheel, axle failed at brake journal. Ref: NTSB file 1-0018.
G113 Cessna 182B	13 May 65	0 S Northbrook, Ill. USA. Nose wheel fork. Ref: NTSB file 3-1071.
G114 Morrisey 2150A	19 May 65	0 S Gainesville, Ga. USA. Left gear scissor attach bracket. Ref: NTSB file 3-1099.
G115 Cessna 182	22 Jun 65	0 S Slocum, R.I. USA. Nose gear fork. Ref: NTSB file 3-2191.
G116 Maule M-4	3 Jul 65	0 S Moorpark, Cal. USA. Right center shock strut. Ref: NTSB file 3-2728
G117 Cessna 150	6 Jul 65	0 S Whitehouse, N.J. USA. Nose gear fork. Ref: NTSB file 3-2245.
G118 Piper PA-23 Aztec	13 Jul 65	0 S Renesselaer, Ind. USA. Nose gear turning stop broken. NTSB file 3-2400.

G119 Beech B35 Bonanza	14 Jul 65	0	S Carnegie, Okla. USA. Lower nose gear drag leg bolt. NTSB file 3-2024.
G120 Cessna 182E	15 Jul 65	0	S Kansas City, Mo. USA. Nose gear fork. Ref: NTSB file 3-2107.
G121 Douglas DC-6A (United)	15 Aug 65	0	S Boston, Mass. USA. Nose gear scissor torque link. NTSB file 1-0043
G122 Piper PA-28 Cherokee	18 Aug 65	0	S Culver, Ind. USA. Nose gear strut. Ref: NTSB file 3-2456.
G123 Maule M-4	21 Aug 65	0	S Columbus, Ohio. USA. Right landing gear shock strut. NTSB file 3-2356.
G124 Cessna 182A	23 Aug 65	0	S Dravosburg, Pa. USA. Nose gear fork. Ref: NTSB file 3-2463.
G125 Curtiss C-46F (Zantop)	31 Aug 65	0	S Atlanta, Ga. USA. Gear collapsed. Improperly fabricated hose, wrong bolt. Ref: NTSB file 1-0045.
G126 Stinson 108-2	1 Sep 65	0	S Huron, S.Dak. USA. Tail wheel attach tubing structure. Ref: NTSB file 3-3180.
G127 Aeronca 7AC Champion	7 Sep 65	0	S Ronan, Mont. USA. Landing gear stuffing box (improper weld). Ref: NTSB file 3-3479.
G128 Beech 35-33 Bonanza	9 Sep 65	0	S Omaha, Neb. USA. Nose gear hydraulic actuating cylinder shaft. Ref: NTSB file 3-3184.
G129 Mooney M-20A	23 Sep 65	0	S West Carrollton, Ohio. USA. Tubular spacer between nose gear actuator rod bellcrank and gear retraction rod bellcrank. Ref: NTSB file 3-2931.
G130 Stinson 108-1	28 Sep 65	0	S Grand Rapids, Mich. USA. Tail wheel spring assembly. NTSB file 3-2835.
G131 Great Lakes 2T-1E	30 Sep 65	0	S Spokane, Wash. USA. Right main gear. Ref: NTSB file 3-3484.
G132 Beechcraft C-45H	1 Oct 65	0	S Killeen, Tex. USA. Landing-gear rocker arm switch. NTSB file 3-3792.
G133 Cessna 310C	6 Oct 65	0	S Pasco, Wash. USA. Right main gear oleo strut. NTSB file 3-3496.
G134 Cessna 150	16 Oct 65	0	S West Chester, Pa. USA. Left gear spring assembly. NTSB file 3-2986.

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LANDING GEAR (FIXED-WING)

G135 Meyers 200A	23 Oct 65	0	S Hawthorne, Cal. USA. Left gear lower torque link and down lock link. Ref: NTSB file 3-3840.
G136 Piper J-3C	24 Oct 65	0	S Lake Thonotosas, Fla. USA. Right float (vertical strut ball fitting). Ref: NTSB file 3-3121.
G137 Bellanca 14-13	31 Oct 65	0	S Somerset, Pa. USA. Left landing gear retract strut. NTSB file 3-3440
G138 Mooney M-20E	1 Nov 65	0	S Shreveport, La. USA. Nose gear shock absorber. Ref: NTSB file 3-3069
G139 N. American P-51D Mustang	4 Nov 65	0	S Santa Monica, Cal. USA. Tailwheel turnbuckle shaft. NTSB file 3-3897.
G140 Taylorcraft BC-12D1	7 Nov 65	0	S Westerly, R.I. USA. Tube brace strut, left main gear (weld repair). Ref: NTSB file 3-3241.
G141 Aero Commander 520	8 Nov 65	0	S Minneapolis, Minn. USA. Down lock and retract assembly. NTSB file 3-3882.
G142 Cessna 172	13 Nov 65	0	S College Park, Md. USA. Nose gear attach fitting. Ref: NTSB file 3-3221
G143 Aero Commander 520	17 Nov 65	0	S Oklahoma City, Okla. USA. Right main wheel axle. NTSB file 3-3390.
G144 Cessna 182	23 Nov 65	0	S Rolette, N.D. USA. Nose gear fork casting. Ref: NTSB file 3-4006.
G145 Mooney M-20C	28 Nov 65	0	S Denver, Colo. USA. Nose gear retract truss assembly. Ref: NTSB file 3-3585.
G146 Cessna 180	29 Nov 65	0	S Fort McMurray, Alta. Canada. Right leg (top front bolt hole). Ref: MoT Canada file 2786.
G147 Cessna 172	11 Dec 65	0	S Gaithersburg, Md. USA. Nose gear fork. Ref: NTSB file 3-3721.
G148 Cessna 150E	14 Dec 65	0	S Ronkonkoma, N.Y. USA. Nose gear steering tube assembly rod end bearing. Ref: NTSB file 3-3530.
G149 Beech 23 Muskeeteer	14 Dec 65	0	S Knoxville, Tenn. USA. Right gear at wing attach plate (improperly fastened attach screws). Ref: NTSB file 3-3665.
G150 Cessna 320	18 Dec 65	0	S Teterboro, N.J. USA. Nose wheel drive tube. Ref: NTSB file 3-3650.

G151 Cessna 182	19 Dec 65	0 S Pontiac, Mich. USA. Nose gear fork. Ref: NTSB file 3-3595.
G152 Cessna 310C	22 Dec 65	0 S Memphis, Tenn. USA. Nose gear main drive tube assembly. Ref: NTSB file 3-3734.
G153 Mooney M-20A	2 Jan 66	0 S Goodland, Kans. USA. Weld on spacers of clevis fittings on lateral torque rod failed. Ref: NTSB file 3-0569.
G154 Beech 23 Musketeer	8 Jan 66	0 S Joliet, Ill. USA. Right main landing gear. Ref: NTSB file 3-0192.
G155 Cessna 180	14 Jan 66	0 S Reno, Nev. USA. Tail wheel steering mechanism. NTSB file 3-0237
G156 Piper PA-22	13 Feb 66	0 S Flint, Mich. USA. Nose gear mount. Ref: NTSB file 3-0216.
G157 Cessna 150	17 Feb 66	0 S Hot Springs, Ark. USA. Nose gear mounting bracket. NTSB file 3-0290.
G158 Piper PA-23 Aztec	19 Feb 66	0 S East St. Louis, Ill. USA. Nose gear retract strut. Ref: NTSB file 3-1807.
G159 Stinson 108-1	20 Feb 66	0 S Shirley, Mass. USA. Right main gear hinge pin. NTSB file 3-0463
G160 Cessna 210	22 Feb 66	0 S Lafayette, La. USA. Left main gear actuator spindle shaft. Ref: NTSB file 3-0377.
G161 Temco D-16A	16 Mar 66	0 S Jackson, Miss. USA. Nose gear collar attaching retract rods. Ref: NTSB file 3-0641.
G162 Beech C-45G	23 Mar 66	0 S Kanapali, Hawaii. USA. Nose gear attach points. Ref: NTSB file 3-0648.
G163 Aero Commander 520	28 Mar 66	0 S Muskogee, Okla. USA. Nose gear body assembly. Ref: NTSB file 3-1124.
G164 Piper J-3C	2 Apr 66	0 S Vicksburg, Miss. USA. Right main gear strut. Ref: NTSB file 3-0658.
G165 Beech B50 Twin Bonanza	6 Apr 66	0 S Jackson, Miss. USA. Nose gear jack screw mounting. NTSB file 3-0616.
G166 Mooney M-20	16 Apr 66	0 S Kingman, Kans. USA. Nose gear struts (welds). Ref: NTSB file 3-2162
G167 Cessna 180B	21 Apr 66	0 S Whitehorse, Y.T. Canada. Right gear leg (top axle attachment holes). Ref: MoT Canada file 2898.

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LANDING GEAR (FIXED-WING)

- G168 Norseman 6 23 Apr 66 0 S Bowden Lake, Man. Canada.
Right gear shock strut stub leg (cracks in weld repair). Ref: MoT Canada file 2924.
- G169 Piper PA-18 Super Cub 23 Apr 66 0 S Tyonek, Alas. USA.
Landing gear: ski assembly. NTSB file 3-1573.
- G170 Grumman G-164 AgCat 29 Apr 66 0 S Abbeville, La. USA.
Main landing gear. Ref: NTSB file 3-1574.
- G171 Cessna 310 29 Apr 66 0 S Concord, Cal. USA.
Nose gear bell crank. Ref: NTSB file 3-0882.
- G172 Bellanca 14-13 7 May 66 0 S Tony, Wis. USA.
Welded fitting in right gear screw shaft assembly. Ref: NTSB file 3-1084.
- G173 Piper PA-24 Commanche 26 May 66 0 S Salem, Ore. USA.
Nose gear push-pull rod (thread at inboard end). Ref: NTSB file 3-1121.
- G174 Piper PA-22 18 Jun 66 0 S Ronkonkoma, N.Y. USA.
Main landing gear. Ref: NTSB file 3-1523.
- G175 Cessna 172 21 Jun 66 0 S High Point, N.C. USA.
Nose wheel fork. Ref: NTSB file 3-1533.
- G176 Cessna 180 23 Jun 66 0 S Prince George, B.C. Canada.
Right wheel brake disc retaining clips. Ref: MoT Canada file 2995.
- G177 Cessna 182C 2 Jul 66 0 S Hyannis, Mass. USA.
Nose wheel fork. Ref: NTSB file 3-3208.
- G178 Lockheed L-188A Electra (Braniff) 21 Jul 66 0 S Fort Worth, Tex. USA.
Left main gear door actuating piston. Ref: NTSB file 1-0070.
- G179 Luscombe 8A 22 Jul 66 0 S Titusville, Fla. USA.
Left landing gear drag brace bolt. Ref: NTSB file 3-1980.
- G180 Helio H-391B Courier 2 Aug 66 0 S Van Nuys, Cal. USA.
Right strut failed. Flown extensively from rough fields. Ref: NTSB file 3-3106.
- G181 Cessna 180A 3 Aug 66 0 S Moberly Lake, B.C. Canada.
Right gear leg immediately above axle upper attachment bolt holes. (Fretting). Ref: MoT Canada file 3071.
- G182 Piper PA-18 Super Cub 4 Aug 66 0 S Gakona, Alas. USA.
Left axle shaft separated. Flown extensively from rough strips. Ref: NTSB file 3-3506.

G183 Navion B	12 Aug 66	0 S	Bakersfield, Cal. USA. Nose gear trunnion unit (weld). NTSB file 3-2866.
G184 Cessna 310F	13 Aug 66	0 S	Chantilly, Va. USA. Nose gear actuating rod. Ref: NTSB file 3-2029.
G185 Sud Aviation SE-210 Caravelle (United)	22 Aug 66	0 S	Newark, N.J. USA. Nose wheel axle spindle (improperly shot-peened). Ref: NTSB file 1-0053.
G186 Cessna 182A	3 Sep 66	0 S	Pottstown, Pa. USA. Nose gear shimmy dampener arm and nose wheel fork failed. Ref: NTSB file 3-2340.
G187 Cessna 180	6 Sep 66	0 S	Tarentum, Pa. USA. Left gear attach bolt. Ref: NTSB file 2-0784.
G188 Grumman G-164 AgCat	8 Sep 66	0 S	McAdoo, Tex. USA. Left gear at fuselage attach point. Ref: NTSB file 3-2527.
G189 Piper PA-30 Twin Commande	14 Sep 66	0 S	Louisville, Ky. USA. Ball joint end of landing gear actuating conduit pin (threads). Ref: NTSB file 3-2156.
G190 Cessna 310H	27 Sep 66	0 S	Purchase, N.Y. USA. Uplock torque tube (nose gear). NTSB file 3-3885.
G191 Cessna 182A	28 Sep 66	0 S	Cairo, Ga. USA. Nose wheel shimmy dampener. NTSB file 3-3134.
G192 Cessna 182E	10 Oct 66	0 S	Nashville, Tenn. USA. Nose gear fork at strut attachment. Ref: NTSB file 3-2664.
G193 Cessna 170B	13 Oct 66	0 S	Shelby, Miss. USA. Right main wheel axle separated at radius of axle to flange mount. Ref: NTSB file 3-2581.
G194 Aero Commander 520	14 Oct 66	0 S	Houma, La. USA. Nose wheel fork (bolt holes). NTSB file 3-3155.
G195 Cessna 210	17 Dec 66	0 S	Newburyport, Mass. USA. Left main landing gear actuator assembly spindle. Ref: NTSB file 3-4351.
G196 Piper PA-28 Cherokee	16 Jan 67	0 S	Pasadena, Md. USA. Nose wheel strut mount adjacent to weld. Ref: NTSB file 3-0169.
G197 Cessna 182E	18 Jan 67	0 S	Vichy, Mo. USA. Nose wheel fork. NTSB file 3-0205.
G198 Cessna 182	31 Jan 67	0 S	Helena, Mont. USA. Nosewheel fork. Ref: NTSB file 3-0294.

LANDING GEAR (FIXED-WING)

G199 Douglas DC-6B (Northeast)	22 Feb 67	0	S Martha's Vineyard, Mass. USA. Left landing gear strut piston. NTSB file 1-0012.
G200 D.H. 114 Heron 1B	25 Feb 67	0	S Montego Bay, Jamaica. Left axle plug, nose gear. Ref: Jamaica
G201 Beech D50 Twin Bonanza	15 Mar 67	0	S Birmingham, Ala. USA. Nose gear shimmy damper jammed, failed nose gear. Ref: NTSB file 3-0870.
G202 Cessna 150	19 Mar 67	0	S Blytheville, Ark. USA. Left trunnion bolt. Ref: NTSB file 3-0891.
G203 Mooney M-20	21 Mar 67	0	S Minden, Nev. USA. Landing gear lever bell cranks in attach welds. Ref: NTSB file 3-0983.
G204 Fleet 80 Canuck (skis)	24 Mar 67	0	S Wawa, Ont. Canada. Left undercarriage axle at machine mark. Ref: MoT Canada file 3329.
G205 Stinson 108-1	9 Apr 67	0	S Brookhaven, N.Y. USA. Tubular member attached to tailwheel and fuselage failed. Ref: NTSB file 3-1148.
G206 Cessna 180	16 Apr 67	0	S Monticello, Ut. USA. Tail wheel spring. NTSB file 3-1223.
G207 Cessna 180F (ski-wheel)	17 Apr 67	0	S Twin Falls, Labrador. Canada. Right gear leg at upper forward wheel attachment bolt hole. Ref: MoT Canada file 3349.
G208 Cessna 182	23 Apr 67	0	S Millville, N.J. USA. Nose wheel fork. Ref: NTSB file 3-1373.
G209 Piper PA-22	20 May 67	0	S Lexington, Mo. USA. Left landing gear forward and rear vee tubes. Ref: NTSB file 3-1721.
G210 Stinson V-77	20 May 67	0	S Lincoln, R.I. USA. Left landing gear oleo piston rod. Ref: NTSB file 3-2300.
G211 Cessna 140	30 May 67	0	S North Kingstown, R.I. USA. Left landing gear. Ref: NTSB file 3-2393.
G212 Beech J35 Bonanza	31 May 67	0	S Lufkin, Tex. USA. Nose gear push-pull rod end (threaded area). Ref: NTSB file 3-1962.
G213 Vickers 745D Viscount (United)	26 Jun 67	0	S Grand Rapids, Mich. USA. Nose wheel pivot pin (lubrication holes). Ref: NTSB file 1-0036.

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LANDING GEAR (FIXED-WING)

G214 Cessna 182E	29 Jun 67	0	S Teterboro, N.J. USA. Landing gear: nose wheel assemblies. Ref: NTSB file 3-2254.
G215 Cessna 140A	1 Jul 67	0	S North Canton, Ohio. USA. Left gear (bolt hole at step attach point). Ref: NTSB file 3-2165.
G216 Cessna 170	22 Jul 67	0	S Miltonvale, Kans. USA. Left landing gear axle. Ref: NTSB file 3-2516.
G217 de Havilland DHC-3 Otter	6 Aug 67	0	S Cape Sparbo, NWT. Canada. Main gear attachment bolt. Ref: MoT Canada file 3559.
G218 Stits SA3B	2 Sep 67	0	S Owatonna, Minn. USA. Failure of pedal torque tube attached to nose steering broken welds on brace tubes from engine mount to gear. Ref: NTSB file 3-3732.
G219 Cessna 120	6 Sep 67	0	S Pekin, Ill. USA. Left gear at bolt hole holding step. Ref: NTSB file 3-4749.
G220 Cessna 172	14 Oct 67	0	S Salem, Ind. USA. Nose wheel fork. Ref: NTSB file 3-4001.
G221 Bellanca 14-193	21 Oct 67	0	S Kenner, La. USA. Right upper strut of nose gear assembly. Ref: NTSB file 3-3776.
G222 Cessna 195	3 Nov 67	0	S Arcata, Cal. USA. Main gear. Origin: drilled hole, right strut. NTSB file 3-3817.
G223 Beech A35 Bonanza	19 Nov 67	0	S Visalia, Cal. USA. Nose gear actuator retract arm. NTSB file 3-4167
G224 Vickers 745D Viscount (United)	28 Nov 67	0	S Raleigh-Durham, N.C. USA. Valve body of nose wheel steering jack twin relief valve. Ref: NTSB file 1-0058.
G225 Cessna 182A	29 Nov 67	0	S El Paso, Tex. USA. Nose wheel fork. Ref: NTSB file 3-4183.
G226 Cessna 182	12 Dec 67	0	S Jefferson, Ga. USA. Nose wheel shimmy dampener attach bracket. Ref: NTSB file 3-4741.
G227 Cessna 175	15 Jan 68	0	S Williams Lake, B.C. Canada. Nose wheel fork at fork attachment bolt lug fillets. Ref: MoT Canada file 3729.

LANDING GEAR (FIXED-WING)

- G228 Cessna 180 25 Feb 68 0 S Peace River Airport, Alta. Canada.
Tail wheel torque tube at forward bolt holes
inside servo casting. Ref: MoT Canada file 3778
- G229 Cessna 210 25 Feb 68 0 S Howell, Mich. USA.
Nose wheel fork. Ref: NTSB file 3-0328.
- G230 Douglas A-26 Invader 16 Mar 68 0 S Kansas City, Kans. USA.
Right gear trunnion pivot fittings. Ref: NTSB
file 3-0830.
- G231 Douglas DC-3C 3 May 68 0 S Jacksonville, Fla. USA.
Bearing bolt, left landing gear. NTSB file 3-4490
- G232 Grumman G-164 AgCat 8 May 68 0 S Elton, La. USA.
Left main gear. Ref: NTSB file 3-1213.
- G233 Cessna 150 14 May 68 0 S Jacksonville, Ark. USA.
2 broken diagonal members holding upper nose gear
retaining collar in place. Ref: NTSB file 3-2018.
- G234 Cessna 150 15 May 68 0 D Montgomery, Ala. USA.
Nose wheel fork. Ref: NTSB file 3-1393.
- G235 Douglas DC-4 (Ansett-ANA) 26 Jun 68 0 S Launceston, Australia.
Bolt attaching lower torque link to nose-wheel
fork. Ref: WAAS p. 11/68 & Australia DoT
- G236 Luscombe 8A 13 Jul 68 0 S Longwood, Fla. USA.
Left gear jack strut attach bolt. Ref: NTSB
file 3-4086.
- G237 Cessna 310 30 Aug 68 0 S Pittstown, N.J. USA.
Torque tube assembly at LH bearing assembly.
Ref: NTSB file 3-3011.
- G238 Piper PA-28 Cherokee 22 Sep 68 0 S Canandaigua, N.Y. USA.
Nose gear shock strut piston. NTSB file 3-3639.
- G239 Cessna 182A 29 Sep 68 0 S Mill Creek, Okla. USA.
Nose gear fork had cracks at strut attach bolt.
Ref: NTSB file 3-3157.
- G240 Globe GC-1B 12 Oct 68 0 S Washburn, Iowa, USA.
Right gear actuating arm. NTSB file 3-3259.
- G241 American AA-1 Yankee 21 Nov 68 0 S Bayport, N.Y. USA.
Nose gear strut above fork attach point. Ref:
NTSB file 3-4345.
- G242 Beech E18S 20 Dec 68 0 S Los Angeles, Cal. USA.
Attach screw to push rod assembly. Ref: NTSB
file 3-4635.

G243 Cessna 310B-A1	1969	0	S Bankstown, NSW, Australia. Right main gear actuator tube (inboard rivet line). Previous buckling. Ref: Australia DoT.
G244 Cessna 210B	1969	0	S Cudal, NSW, Australia. Port leg (saddle failed). Ref: Australia DoT
G245 Cessna A188	1969	0	S Byabarra, NSW, Australia. Port spring leg at attachment to fuselage fitting. Ref: Australia DoT.
G246 Travel Air D4000	20 Jan 69	0	S Tallulah, La. USA. Right main gear separated at fuselage. Ref: NTSB file 3-1661.
G247 Beech E18S	5 Feb 69	0	S La Crosse, Wis. USA. Landing gear slide tube. Ref: NTSB file 3-0030.
G248 Cessna 150E	10 Feb 69	0	S Johnson, Kans. USA. Landing gear, nosewheel assemblies. Commonly used on rough strips. Ref: NTSB file 3-0517.
G249 Piper PA-23 Aztec	5 Mar 69	0	S Lake Wales, Fla. USA. Rear tube of drag brace assembly (nose wheel). Ref: NTSB file 3-1854.
G250 Beech C-45G	21 Mar 69	0	S Fort Lauderdale, Fla. USA. Nose gear fork. Ref: NTSB file 3-0409.
G251 Piper PA-23 Aztec	21 Mar 69	0	S Jacksonville, Fla. USA. Nose gear upper drag link. NTSB file E-0007.
G252 Cessna 195	25 Apr 69	0	S Keene, N.H. USA. Right landing gear. Ref: NTSB file 3-1405.
G253 Beech G18S	5 May 69	0	S Tulsa, Okla. USA. Right main gear drag leg (weld). NTSB file 3-2148
G254 Beech 23 Musketeer	16 May 69	0	S Colts Neck, N.J. USA. Main landing gear. Ref: NTSB file 3-1837.
G255 Erco 415-C Ercoupe	29 Jun 69	0	S Bradford, Pa. USA. Nose wheel steering ball joint fitting. Ref: NTSB file 3-2964.
G256 Convair 990 (American)	29 Jul 69	0	S Fort Worth, Tex. USA. Landing gear support beam. NTSB file 1-0053.
G257 Convair 600 (Texas Int'l)	1 Aug 69	0	S Houston, Tex. USA. Nose gear retract cylinder rod. NTSB file 1-0037.
G258 Cessna 150	23 Aug 69	0	S San Bernardino, Cal. USA. Landing gear (nosewheel assemblies). Ref: NTSB file 3-3580.

LANDING GEAR (FIXED-WING)

G259 Boeing E75 Stearman	5 Sep 69	0	S Orange, Tex. USA. Right gear. Ref: NTSB file 3-3898.
G260 Douglas DC-8 (Delta)	17 Sep 69	0	S Dallas, Tex. USA. Landing gear lower lug of forward bogie beam. Ref: NTSB file 1-0056.
G261 Cessna 140	24 Oct 69	0	S Flint, Mich. USA. Right gear at step assembly attach point. Ref: NTSB file 3-4291.
G262 Cessna 195	13 Nov 69	0	S Nashville, Tenn. USA. Left gear (wedges on outboard side of fuselage gear saddle). Ref: NTSB file 3-4438.
G263 Cessna 140	17 Dec 69	0	S Sand Springs, Okla. USA. Left wheel fell off (broken axle). Ref: NTSB file 3-4536.
G264 Cessna A188	1970	0	S Newrybar, NSW, Australia. Right gear leg fractured. Ref: Australia DoT.
G265 Transavia PL-12 Airtruk	1970	0	S Narrabri, NSW, Australia. Nose landing gear strut. Ref: Australia DoT.
G266 Beech E50 Twin Bonanza	1970	0	S Katherine NT, Australia. Nose gear retract mechanism. Ref: Australia.
G267 Cropmaster YAL-25	1970	0	S Cudgewa Vic., Australia. Main gear strut plunger. Ref: Australia DoT.
G268 Piper PA 25-150 Pawnee	1970	0	S Marlborough Qld., Australia. Undercarriage V-brace. Ref: Australia DoT
G269 Cessna 185A	1970	0	S Moora, W.A., Australia. Port undercarriage main leg. Ref: Australia DoT
G270 Cessna 180 (skis)	9 Feb 70	0	S Bathurst Inlet, NWT. Canada. Left gear leg at wheel axle upper attachment bolt hole. Ref: MOT Canada file W0007.
G271 Cessna 190	25 Feb 70	0	S Lewiston, Id. USA. Main gear assembly. Ref: NTSB file 3-1059.
G272 Cessna 120	2 Mar 70	0	S Gaithersburg, Md. USA. Right landing gear support bracket. Ref: NTSB file 3-0467.
G273 Cessna 150G	23 Mar 70	0	S Archer, Fla. USA. Nosewheel strut support tubes. NTSB file 3-0748.
G274 Ted Smith Aerostar 600	1 Apr 70	0	S Bedford, Pa. USA. Main landing gear piston. Cracks formed during heat treatment process. Ref: NTSB file 3-0767

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LANDING GEAR (FIXED-WING)

- G275 Cessna 402 22 Apr 70 0 S Pembina, N.Dak. USA.
 Left main landing gear torque arm attach lug.
 Ref: NTSB file E-0001.
- G276 Cessna 180A 23 Apr 70 0 S Inuvik, NWT. Canada.
 (ski/wheels) Right gear leg at axle attachment upper bolt
 holes. Ref: MOT Canada file W0021.
- G277 Canadair 30 Apr 70 0 S New York, N.Y. USA.
 CL-44J Mounting lug of left main gear actuating mount-
 (Icelandic) ing bracket (at bolt hole). Ref: Iceland.
- G278 Cessna 172 28 Jun 70 0 S Lodi, Cal. USA.
 Nose wheel fork at sides of strut attach point.
 Ref: NTSB file 3-1235.
- G279 Champion 7ECA 6 Aug 70 0 S West Chester, Pa. USA.
 Left main gear attach bolt. Ref: NTSB file
 3-3287.
- G280 Boeing 727 28 Sep 70 0 S Las Mercedes Airport, Managua, Nicaragua.
 (Pan Rear support of actuating link, left-gear door.
 American) Ref: WAAS p. 25/70.
- G281 Beech E18S 3 Oct 70 0 S Anniston, Ala. USA.
 Landing gear support assembly. NTSB file 3-4611.
- G282 Boeing 727 4 Nov 70 0 S Savannah, Ga. USA.
 (National) Right main landing gear aft trunnion support
 beam. Ref: NTSB file 1-0040.
- G283 Douglas DC-6B 5 Nov 70 0 D Kerkyra, Greece.
 Upper torque link of nose gear. Ref: ICAO ADREP
 357/70.
- G284 Cessna 120 8 Nov 70 0 S Lowell, Mich. USA.
 Right axle. Ref: NTSB file 3-4139.
- G285 Cessna 180 11 Nov 70 0 S Nantucket, Mass. USA.
 Left wheel attach bolts. Ref: NTSB file 3-4155.
- G286 Consolidated 14 Nov 70 0 S Christiansted, Vi. USA.
 28-5AC PBY Left main gear hydraulic actuator. Ref: NTSB
 Catalina file 3-1708.
- G287 Champion 18 Nov 70 0 S Dayton, Ohio. USA.
 7ECA Right axle at strut attach mounting pad. Ref:
 NTSB file 3-4200.
- G288 Beech 23 24 Nov 70 0 S Davenport, Iowa. USA.
 Musketeer Right main landing gear housing. NTSB file 3-4224
- G289 Cessna 185 26 Nov 70 0 S Glenallen, Alas. USA.
 Right gear strut spring. NTSB file 3-4245.

LANDING GEAR (FIXED-WING)

G290 Champion 7ECA	28 Nov 70	0	S Santa Ana, Cal. USA. Left main gear attach bolt. NTSB file 3-4289.
G291 Boeing 727 (Continental)	16 Dec 70	0	S Burbank, Cal. USA. Left main landing gear trunnion beam at bearing hole. Ref: NTSB file 1-0047.
G292 Douglas DC-6B	19 Dec 70	0	S Malaga, Spain. Attachment fitting securing the recovery spring cable to lower end of left landing gear leg. Ref: Belgium AA.
G293 Convair 580 (Frontier)	23 Dec 70	0	S Kansas City, Mo. USA. Left main landing gear inboard strut outer cylinder. Ref: NTSB file 1-0044.
G294 Vought A-7 Corsair II (USAF)	1971	1	? ? Nose gear failed during catapult launch. Crack in landing gear strut. Ref: AWST 29 Nov/71 p 22
G295 Vought A-7 Corsair II (USAF)	1971	0	? ? Nose gear failed during catapult launch. Crack in landing gear strut. Ref: AWST 29 Nov/71 p 22
G296 Cessna 188A	1971	0	S Tumut, NSW, Australia. Left gear collapsed. Ref: Australia DoT.
G297 Cessna A188	1971	0	S Goulbourn, NSW, Australia. Inboard attach bolt of right gear. Ref: Australia DoT.
G298 Cessna 210B	1971	0	S Cudal, NSW, Australia. Actuator spindle (right gear). Ref: Australia.
G299 Cessna 185A	1971	0	S Geraldton, WA, Australia. Cross tube of tailwheel. Ref: Australia DoT.
G300 Cessna 185	1971	0	S Geraldton, WA, Australia. Nosewheel on port float (faulty bolt). Ref: Australia DoT.
G301 Beech 95-C55 Baron	1971	0	S Dampier WA, Australia. Nose gear, plunger rod assembly (fork end bolt holes). Ref: Australia DoT.
G302 Grumman 164A AgCat	1971	0	S Dayboro, Qld. Australia. Gear collapsed. Ref: Australia.
G303 Mooney M-21	14 Feb 71	0	S North Shore, Cal. USA. Actuating lever (weld). Ref: NTSB file 3-0830.
G304 Boeing 727 (American)	26 Feb 71	0	S St. Louis, Mo. USA. Left gear trunnion support beam (attach hole). Ref: NTSB file 1-0031.

G305 Cessna 170A	4 Mar 71	0 S	LeClaire, Iowa. USA. Right wheel axle. Ref: NTSB file 3-0824.
G306 Cessna 185	12 Mar 71	0 S	Tasman Glacier, New Zealand. Port gear leg (axle attachment). Ref: NZ 71-027
G307 Champion 7GCBC	23 May 71	0 S	Elsinore, Cal. USA. Left main landing gear attach bolt. Ref: NTSB file 3-1708.
G308 Beech 35 Bonanza	20 Jun 71	0 S	Golts, Md. USA. Nose wheel fork (weld). Ref: NTSB file 3-1181.
G309 Stinson L-5G	27 Jun 71	0 S	Murfreesboro, Tenn. USA. Tail wheel (old crack). Ref: NTSB file 3-1811.
G310 Beech A23 Muskeeter	3 Jul 71	0 S	Joliet, Ill. USA. Right gear casting. Ref: NTSB file 3-2664.
G311 Grumman G-164 AgCat	14 Aug 71	0 S	Buttonwillow, Cal. USA. Left gear leg. Ref: NTSB file 3-3011.
G312 Grumman G-164 AgCat	17 Aug 71	0 S	Davis, Cal. USA. Main landing gear. Ref: NTSB file 3-3099.
G313 Bolkow 208	29 Aug 71	0 S	Rotorua Airport, New Zealand. Nose leg outer tube. Ref: NZ brief 71-079.
G314 Piper PA-32 Cherokee SIX	15 Sep 71	0 S	Boonville, Mo. USA. Axle of right gear (tool mark). Ref: NTSB file 3-3718.
G315 Piper PA-18 Super Cub	20 Sep 71	0 S	Chitina, Alas. USA. Left axle. Ref: NTSB file 3-3809.
G316 Commonwealth 185	20 Sep 71	0 S	Mesa, Ariz. USA. Right landing gear tube. Ref: NTSB file 3-3815
G317 Transavia PL-12 Airtruk	1972	0 S	Mudee, NSW, Australia. Port landing gear, inner pivot attach lug. Ref: Australia DoT.
G318 Transavia PL-12 Airtruk	1972	0 S	Omeo, Vict. Australia. Nose gear at weld. Ref: Australia DoT
G319 Cessna 210-5	1972	0 S	Surfers Gardens, Qld. Australia. Attachment bolt, right spring leg (wrong nut). Ref: Australia DoT.
G320 Piper PA 25-150 Pawnee	1972	0 S	Kingaroy Qld., Australia. Brace tube, left main gear. Ref: Australia DoT.
G321 Champion 7GCBA	3 Mar 72	0 S	Edgefield, S.C. USA. Left gear (attach bolt). Ref: NTSB file 3-0662

LANDING GEAR (FIXED-WING)

G322 de Havilland DH-104 Dove	14 Mar 72	0	S San Juan, Puerto Rico. Left gear actuating piston. NTSB file 3-1422.
G323 Piper PA-28-140 Cherokee	1 May 72	0	S St. Hubert, Que. Canada. Right gear lower torque link (scissor). AD not complied with. Ref: MOT Canada file Q20040.
G324 Convair 600 (Texas Int'l)	8 May 72	0	S Alexandria, La. USA. Nose gear piston rod. Ref: NTSB file 1-0015.
G325 Piper PA-28-140B Cherokee	12 May 72	0	S St. Hubert, Que. Canada. Right gear upper torque link (AD not complied with). Ref: MOT Canada file Q20039.
G326 Cessna 182F	31 May 72	0	S Logansport, Ind. USA. Left gear strut. Origin: fretting corrosion. Ref: NTSB file 3-0173.
G327 Cessna 180	10 Jun 72	0	S Menomonee Falls, Wis. USA. Main gear (fretting). Ref: NTSB file 3-2371.
G328 Douglas DC-3 (Ansett Airlines Papua)	12 Jul 72	0	S Wapenamanda, Papua, New Guinea. Starboard gear Y fitting (bolt hole). Ref: WAAS p. 22/72.
G329 Cessna 170	17 Jul 72	0	S Chugiak, Alas. USA. Landing gear. Ref: NTSB file 3-2486.
G330 Aeronca 11AC Super Chief	18 Jul 72	0	S Two Harbors, Minn. USA. Left front landing gear fitting lug (bolt holes). Ref: NTSB file 3-2414.
G331 Cessna TU206B	22 Jul 72	0	D Lone Pine, Calif. USA. Nose gear steering collar. NTSB file 3-3427
G332 Aero Commander Snow	3 Aug 72	0	S Cashmore Airstrip Kinleith, New Zealand. AN9-52 bolt, linking upper tripod to shock strut of right gear. Ref: NZ brief 72-071.
G333 de Havilland Comet 4 (Dan Air)	20 Aug 72	0	S Salzburg, Austria. Nose wheel jack piston head. Ref: WAAS p 25/72
G334 N. American Sabreliner 40	28 Aug 72	0	S Columbia, Mo. USA. Right gear outer cylinder. NTSB file 3-1440
G335 Boeing 727	1 Oct 72	0	S San Francisco, Cal. USA. Stress corrosion and fatigue, front trunnion bearing support fitting. Ref: NTSB file 1-0044.
G336 Cessna 195	23 Oct 72	0	S Santa Ana, Cal. USA. Gear collapsed. Ref: NTSB file 3-2906.
G337 Intermount A9A	1973	0	S Bridgetown WA, Australia. Bottom shock strut terminal, port gear. Ref: Australia DoT.

G338 Champion 7GCAA Citabria	1973	0	S Moorooduc Vic., Australia. Attach bolts, port gear. Ref: Australia DoT.
G339 Transavia PL-12 Airtruk	1973	0	S Corryong, Vict., Australia. Nose gear support structure faulty. Ref: Australia DoT.
G340 Cessna 210A	1973	0	S Groote Eylandt, NT, Australia. Shaft of spindle flange in port gear actuator.
G341 Cessna A188-A	1973	0	S Geraldton, WA, Australia. Left mainwheel bolt. Ref: Australia DoT.
G342 Piper PA 18-150 Super Cub	1973	0	S Camden NSW, Australia. Main gear strut to fuselage attach fitting. Ref: Australia DoT.
G343 Boeing 707-320	1973	0	S Sydney NSW, Australia. Left main gear trunnion support rib (inboard flange rear fastener hole). Ref: Australia DoT
G344 Auster 3F	1973	0	S South Marulan NSW, Australia. Radius rod, right gear. Ref: Australia DoT.
G345 Auster 3F	1973	0	S Singleton NSW, Australia. Broken weld, stub axle fitting, right gear. Ref: Australia DoT.
G346 Piper PA 25-235 Pawnee	1973	0	S Griffith NSW, Australia. Undercarriage main gear shock absorbing system. Ref: Australia DoT.
G347 Grumman G-164 12 Mar 73 AgCat		0	S Hockley, Tex. USA. Landing gear. NTSB file 3-0407.
G348 Beech D18S	14 Mar 73	0	S Oakland, Cal. USA. Right hand drive shaft support bracket of nose gear. Ref: NTSB file 3-0510.
G349 Lockheed 382G Hercules (Saturn Airways)	17 Mar 73	0	S Pensacola, Fla. USA. Nose gear cylinder. Origin: stress-corrosion pits. Ref: NTSB file 1-0006.
G350 Boeing 707 (Pan Am)	9 Apr 73	0	S Miami, Fla. USA. Nose gear outer cylinder. Origin: pre-existing stress corrosion crack. Ref: NTSB file 1-0010.
G351 Vickers Viscount (British Midland)	8 Jun 73	0	S East Midlands, UK. Nose undercarriage support structure. Ref: WAAS p. 16/73.
G352 Convair 580 (U.S. Air)	12 Jun 73	0	S Pittsburgh, Pa. USA. Nose gear upper left drag strut. Ref: NTSB file 1-0014.

LANDING GEAR (FIXED-WING)

- G353 Socata 880B 17 Jul 73 0 S Bad Duerkheim, W. Germany.
Rallye Club Strut attachment of front gear leg. Ref: W. German file 3X0296.
- G354 Sportavia RF4D 5 Aug 73 0 S Vielbrunn, W. Germany.
Avion-Planeur Landing gear. Ref: W. German file 3X0342.
- G355 Beech 65-80 8 Aug 73 0 S Chattanooga, Tenn. USA.
Queen Air Nose gear actuator assembly attach bolt. Ref: NTSB file 3-2205.
- G356 Beech C-45H 17 Aug 73 0 S Los Angeles, Cal. USA.
Right brake froze due to worn brake puck, over-stressed weakened right drag link of main gear. Ref: NTSB file 3-2902.
- G357 Handley Page Herald 4 Sep 73 0 S Gatwick, UK.
(Br. Island) Front pressure bulkhead around nose gear down-lock failed, allowing downlock catch to spring out. Ref: WAAS p. 26/73.
- G358 Transavia PL-12 Airtruk 6 Sep 73 1 S Swan Vale, N.S.W., Australia.
Nosewheel steering pin. Ref: Australia DoT.
- G359 Maule M-4-220C 23 Sep 73 0 S Bethel, Alas. USA.
Main gear. Ref: NTSB file 3-3757.
- G360 Cessna 150E 27 Sep 73 0 S Kirchheim-Teck, W. Germany.
Main landing gear strut attachment (sharp notch). Ref: W. German file 3X0452.
- G361 Luscombe 8A 4 Nov 73 0 S Denton, Tex. USA.
Front left landing gear attachment. Ref: NTSB file 3-3499.
- G362 Cessna A188 20 Nov 73 0 S Awatoitoi Station, New Zealand.
Port gear leg at fuselage. Origin: fretting. Ref: NZ brief 73-139.
- G363 Transavia PL-12 Airtruk 1974 0 S Geraldton, WA, Australia.
Right main wheel pivot bracket (weld). Ref: Australia DoT.
- G364 Transavia PL-12 Airtruk 1974 0 S Mudgee, NSW, Australia.
Poor weld, nose strut to engine mount. Ref: Australia DoT.
- G365 Cessna 180A 1974 0 S Boulia, Qld, Australia.
Right spring leg. Ref: Australia DoT.
- G366 Piper PA 25-235 Pawnee 1974 0 S Oberon NSW, Australia.
Left gear front attachment (poor weld). Ref: Australia DoT.
- G367 Beech H35 Bonanza 6 Jan 74 0 S Canyon, Tex. USA.
Nose gear brace assembly. Ref: NTSB file 3-0231.

- G368 Piper PA-28 14 Feb 74 0 S Sanford, Fla. USA.
Cherokee 2 lugs on main-gear cylinder. NTSB file 3-0281.
- G369 Piper PA-18 3 Mar 74 0 S Shungnak, Alas. USA.
Super Cub Crack in right gear. Ref: NTSB file 3-0291.
- G370 Aerospatiale 15 Mar 74 16 D Tehran, Iran.
Caravelle 10B3 Attachment fitting of main undercarriage. Ref:
Denmark Dept. of Accident Investigation
- G371 Cessna F172 4 Apr 74 0 S Iisalmi, Finland.
Torque link bolt of ski nose landing gear. Ref:
Finland BoA.
- G372 Maule 14 Apr 74 0 S Aalen-Heidenheim, W. Germany.
M-4-210C Tail landing gear. Ref: W. German file 3X0074.
- G373 Piper PA-23 16 Apr 74 0 S Opa Locka, Fla. USA.
Aztec Upper drag link, nose gear. NTSB file 3-1027.
- G374 Piper PA-20 26 Apr 74 0 S Waterloo, Iowa. USA.
Pacer Tailwheel mounting bolt. Ref: NTSB file 3-0984.
- G375 Cessna A188B 30 Apr 74 0 S Arcadia, Fla. USA.
Left main gear spring retention bolt. Ref: NTSB
file 3-2189.
- G376 Transavia 6 May 74 1 S Ashley-Clinton, New Zealand.
PL-12 Airtruk Incompletely-modified nosewheel pivot leg
assembly failed. Ref: NZ report 74-055.
- G377 Piper PA-25 10 May 74 0 S Loxahatchee, Fla. USA.
Pawnee Right main gear shock strut. NTSB file 3-2187.
- G378 Cessna 411 1 Jun 74 0 S Reno, Nev. USA.
Bolt in right main gear retraction assembly.
Ref: NTSB file 3-1488.
- G379 Hawker 8 Jul 74 0 S Point Hope, Alaska, USA.
Siddley Argosy 650 Port landing gear (stress corrosion cracking
and fatigue). Ref: ICAO ADREP 1394/74.
- G380 Cessna 172E 25 Jul 74 0 S Fremont, Neb. USA.
Nose gear scissors assembly. NTSB file 3-2016.
- G381 Schweizer 9 Aug 74 0 S Kissimmee, Fla. USA.
TSC-1A Landing gear strut. Ref: NTSB file 3-3383.
- G382 Cessna 320B 17 Aug 74 0 S Sacramento, Cal. USA.
Left uplock torque tube assembly support stud.
Ref: NTSB file 3-2715.
- G383 Grumman G-164 21 Aug 74 0 S Davis, Cal. USA.
AgCat Right gear leg. Ref: NTSB file 3-2735.

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LANDING GEAR (FIXED-WING)

- G384 Piper PA-22 14 Sep 74 0 S West Hickory, Pa. USA.
Nosewheel assembly. Ref: NTSB file 3-3737.
- G385 MBB BO 209 Monsun 5 Oct 74 0 S Koenigsdorf, W. Germany.
Nose gear strut attachment. Ref: W. German file 3X0457.
- G386 Cessna 172 2 Nov 74 0 S Richland, Wash. USA.
Left gear (14" above axle at spot weld). Ref: NTSB file 3-4077
- G387 Canadair CL-44 (Tradewinds) 22 Dec 74 0 S Lusaka, Zambia.
Nose gear radius rod. Ref: WAAS p 26/74.
- G388 Cessna 182E 1975 0 S Timboon, Vict., Australia.
Fork of nose gear. Ref: Australia DoT.
- G389 Cessna 180H 1975 0 S Jindabyne, NSW, Australia.
Right gear leg. Ref: Australia DoT.
- G390 Piper PA 32-260 Cherokee SIX 1975 0 S Iffley Stn. Qld, Australia.
Left gear torque link bolt. Ref: Australia DoT.
- G391 Auster 3F 1975 0 S Warkworth NSW, Australia.
Port gear gussett plate (poor weld). Ref: Australia DoT.
- G392 Boeing 727-227 1975 0 S Sydney NSW, Australia.
Port main gear (trunnion). Groove machined in during manufacture. Ref: Australia DoT.
- G393 Beech 58 Baron 1975 0 S Townsville Qld. Australia.
Retract rod ball end. Ref: Australia DoT.
- G394 Boeing 707 (American) 18 Feb 75 0 S Longview, Tex. USA.
Nosewheel outer cylinder improperly machined. Ref: NTSB file 1-0003.
- G395 Cessna 180 1 Mar 75 0 S Lake Elmo, Mn. USA.
Fatigue fracture. Rust corrosion break in right main gear leg. Ref: NTSB file 3-0717.
- G396 Beech D18 6 Mar 75 0 S St. Thomas, Virgin Islands.
Tail wheel truss. Ref: NTSB file 3-0611.
- G397 Cessna 421 16 May 75 0 S Kuusamo Airfield, Finland.
Bellcrank in nose gear retraction linkage. Ref: Finland BoA.
- G398 Aeronca 7GCBC Citabria 14 Jun 75 0 S Frechen, W. Germany.
Left main gear leg strut attachment below cowling. W. German file 3X0202.
- G399 Cessna 170 14 Jun 75 0 S Calgary, Alta. Canada.
Left wheel axle. Ref: MoT Canada file W50044.

- G400 Socata 892A 17 Jun 75 0 S Huensborn, W. Germany.
Rallye Commodore Nosewheel axle spindle bolts. Ref: W. German file 3X0209.
- G401 Beech 60A 23 Jul 75 0 S Duesseldorf, W. Germany.
Duke Wheel rim of left main landing gear. Ref: W. German file 3X0313.
- G402 Cessna 185A 3 Aug 75 0 S Casper, Wy. USA.
Left main wheel outer half. NTSB file 3-2183.
- G403 Cessna 180 6 Aug 75 0 S Wheatland, Wy. USA.
Spring landing gear (outside retainer wedge). Ref: NTSB file 3-2184.
- G404 Boeing 727 23 Aug 75 0 S Buffalo, N.Y. USA.
(American) Link assembly trunnion of left main gear. Ref: NTSB file 1-0027.
- G405 Handley Page 28 Aug 75 0 S Tel Aviv, Israel.
Herald (Arkia) Right main gear actuating hydraulic cylinder. Ref: WAAS p. 18/75.
- G406 Vickers 14 Sep 75 0 S Guernsey, Channel Is., UK.
Viscount (Alidair) Nosewheel rear drag members. Ref: WAAS p 20/75
- G407 Douglas 24 Sep 75 0 S Cleveland, Oh. USA.
DC-6B (Zantop) Corner radius of reworked nose gear assembly. Ref: WAAS p. 21/75.
- G408 Piper 4 Oct 75 0 S Varkaus, Finland.
PA-25-260 Landing gear fastening bracket. Finland BoA.
- G409 Socata 885 12 Oct 75 0 S Noerdlingen, W. Germany.
Super Rallye Main landing gear strut attachment. Ref: W. German file 3X0472.
- G410 Cessna 402A 13 Oct 75 0 D Miyako Airport, Japan.
Side link support rib, left landing gear. Ref: Japan MoT.
- G411 Luscombe 8A 18 Oct 75 0 S Willow, Ark. USA.
Eight float attach fitting. NTSB file 3-2438.
- G412 Cessna 195 4 Nov 75 0 S Elko, Nev. USA.
Left spring steel gear leg. NTSB file 3-3679.
- G413 Boeing 747 8 Nov 75 0 S Bombay, India.
(BAOD) Inner hub, no. 8 main wheel. Ref: WAAS p 24/75
- G414 Grumman 23 Dec 75 0 S Zellwood, Fla. USA.
G-164A AgCat Main landing gear. Ref: NTSB file 3-4049.
- G415 Cessna 210B 1976 0 S Alice Springs, NT, Australia.
Hyd. actuator cracked. Ref: Australia DoT.

G-28

LANDING GEAR (FIXED-WING)

G416 Cessna 185A	1976	0	S Wilton, NSW, Australia. Right outboard landing gear support bracket. Ref: Australia DoT.
G417 Cessna 210G	1976	0	S Moorabin, Vict., Australia. Port main gear saddle assembly. Ref: Australia.
G418 Piper PA 31-310 Navajo	1976	0	S Moorabbin Vic., Australia. Hinge on right gear door. Ref: Australia.
G419 Piper PA 22-160	1976	0	S Chilchil Stn., Australia. Right gear leg (weld). Ref: Australia DoT.
G420 Piper PA 23-250 Aztec	1976	0	S Prosperine Qld., Australia. Right main gear drag link centre bolt (excessive wear). Ref: Australia DoT.
G421 Fletcher FU-24	21 Jan 76	0	S Palmerston North, New Zealand. Brackets which attach to piston & scissors link. (weld). Ref: NZ brief 76-014.
G422 Cessna 172	7 Feb 76	0	S Gananoque, Ont. Canada. Left main gear leg. MoT Canada file 060013.
G423 Cessna 140	10 Feb 76	0	S Vankleek Hill, Ont. Canada. Left ski axle. Ref: MoT Canada file 060016.
G424 Interstate S1B1	26 Feb 76	0	S Wasilla, Alas. USA. Landing gear failed. Rust found along break. Ref: NTSB file 3-0130.
G425 Cessna 210H	16 Mar 76	0	S Dothan, Ala. USA. Saddle fitting clamp of main gear. Ref: NTSB file 3-0099.
G426 Piper PA-12 Super Cruiser	18 Mar 76	0	S Elliot Lake, Ont. Canada. Shock cord attachment bolt (left ski). Ref: MoT Canada file 060019.
G427 Grumman G-164A AgCat	19 Apr 76	0	S Kaplan, La. USA. Right gear leg. Ref: NTSB file 3-0928.
G428 Cessna 180 Skywagon	17 May 76	0	S Red Lake, Ont. Canada. Main gear leg. Ref: MoT Canada file C60041.
G429 Cessna 172	31 May 76	0	S Deerfield Beach, Fla. USA. Main landing gear. Ref: NTSB file 3-2120.
G430 Piper PA-12 Super Cruiser	5 Jun 76	0	S Arthur, Ont. Canada. Left undercarriage (fatigue and corrosion). Ref: MoT Canada file 060050.
G431 Beech 95 Baron	13 Jun 76	0	S Wallkill, N.Y. USA. Nose gear aft drag brace. Ref: NTSB file 3-1396.

- G432 Cessna 180 20 Jun 76 0 S Gelnhausen, W. Germany.
 Main landing gear strut attachment. Ref: W. German file 3X0251.
- G433 Piper PA-28 Cherokee 9 Jul 76 0 S Big Bear City, Cal. USA.
 Main gear, upper scissors gear strut lugs. Ref: NTSB file 3-1701.
- G434 Beech 95-C55 Baron 24 Aug 76 0 S Perth WA, Australia.
 Nose gear actuator arm. Ref: Australia DoT.
- G435 Cessna 305 25 Aug 76 0 S Manhattan, Kans. USA.
 Main gear (broken bolt). Ref: NTSB file 3-2355.
- G436 Champion 7ECA 4 Sep 76 0 S Charleston, S.C. USA.
 Right main gear attach bolts. NTSB file 3-2804
- G437 Champion 7GCBC Citabria 18 Sep 76 0 S Winzeln, W. Germany.
 Shock strut of left main gear. Ref: W. German file 3X0481.
- G438 Cessna 402B 7 Oct 76 0 S Hachinoe, Japan.
 Torque arm support bracket, nose gear. Ref: Japan MoT.
- G439 Auster J1B-L 1977 0 S Murray Bridge, SA, Australia.
 Landing gear radius rod. Ref: Australia DoT.
- G440 Piper PA-28-140 Cherokee 1977 0 S Bankstown, NSW, Australia.
 Left main gear torque link (lower shackle bolt). Ref: Australia.
- G441 Cessna 180G 1977 0 S Boorowa, NSW, Australia.
 Left main gear spring leg. Ref: Australia DoT.
- G442 Piper PA-28-140 Cherokee 1977 0 S Murray Bridge, S.A. Australia.
 Torque link bolt in main undercarriage. Ref: Australia DoT.
- G443 Luscombe 8C 27 Mar 77 0 S Pittsfield, Ma. USA.
 Landing gear struts. Ref: NTSB file 3-2130.
- G444 Stinson SR-8C 10 Apr 77 0 S Eveleth, Minn. USA.
 Landing gear. Ref: NTSB file 3-0974.
- G445 de Havilland DHC-3 Otter 14 Apr 77 0 S GB-1, Que. Canada.
 Bolt holding right gear strut to the fuselage (lubrication hole). Ref: MoT Canada file Q70030.
- G446 Aeronca 7GCBC Citabria 16 Jul 77 0 S Albstadt-Degerf., W. Germany.
 Right main gear leg strut attachment below cowling. Ref: W. German file 3X0349.
- G447 Beech D18S 22 Jul 77 0 S Bemidji, Minn. USA.
 Gear collapsed, bolt. NTSB file 3-2471.

LANDING GEAR (FIXED-WING)

G448 Grumman S2E Tracker (RAN)	29 Aug 77	0	S At sea, HMAS Melbourne. Nose wheel trunnion. Ref: Royal Australian Navy
G449 Luscombe 8E	3 Sep 77	0	S Mormon Lake, Ariz. USA. Main landing gear. Ref: NTSB file 3-1947.
G450 Douglas DC-8-61	2 Oct 77	0	S Shannon Airport, Limerick, Ireland. Inboard half of #3 wheel rim. Ref: Ireland
G451 Cessna 170A	30 Oct 77	0	S Bielefeld-Wdbl., W. Germany. Axe of left main landing gear wheel. Ref: W. German file 3X0551.
G452 Cessna 185 Skywagon	6 Nov 77	0	S Winnipeg Beach, Man. Canada. Left landing gear leg at wheel axle mount (axle bolt mounting holes). MoT Canada file C70148
G453 Beech 58 Baron	15 Nov 77	0	S Archerfield Qld., Australia. Nose gear retract rod. Ref: Australia DoT.
G454 Cessna 182E	1978	0	S Beverley, WA, Australia. Right strut, corrosion fatigue. Ref: Australia.
G455 Cessna 210B	1978	0	S Moorabbin, Vict., Australia. Right actuator spindle. Ref: Australia DoT.
G456 Cessna 210A	1978	0	S Rockhampton, Qld. Australia. Hydraulic line between nose gear door actuator & up-lock actuator. Australia DoT.
G457 Cessna 210H	1978	0	S Toowomba, Qld., Australia. Left main gear saddle fractured (misrigging). Ref: Australia DoT.
G458 Cessna 210L	21 Jan 78	0	S Flagstaff, Ariz. USA. Left main gear downlock hook assembly. Ref: NTSB file 3-0655.
G459 Grumman G-44 Widgeon	14 Feb 78	0	S Pilot Point, Ak. USA. Right main gear retract strut. NTSB file 3-1661
G460 Cessna 177	12 Apr 78	0	S Hartford, Conn. USA. Left main gear bolt. Ref: NTSB file 3-2327.
G461 Cessna 188	15 May 78	0	S Cochran, Ga. USA. Main landing gear. Ref: NTSB file 3-2048.
G462 Cessna 180 Skywagon	10 Jun 78	0	S Grand Centre, Alta. Canada. Right undercarriage leg near attachment holes. Ref: MoT Canada file W80049.
G463 SIAI- Marchetti 205-20/R	11 Jun 78	0	S Straubing, W. Germany. Left main gear actuator rod (thread). Ref: W. German file 3X0186.
G464 Grumman G-164A AgCat	13 Jun 78	0	S Pine Prairie, La. USA. Landing gear bolts. Ref: NTSB file 3-1167.

- G465 Cessna 180 Skywagon 23 Jun 78 0 S Manning, Alta. Canada.
Left gear at upper forward axle attaching bolt hole. Ref: MoT Canada file W80064.
- G466 Dyke Delta JD-2 6 Aug 78 0 S Little Rock, Ark. USA.
Gear locking mechanism: forward bottom portion of landing gear handle. Ref: NTSB file 3-1782.
- G467 Piper PA-22 12 Aug 78 0 S Datil, N.M. USA.
Left tube of nose gear mount. NTSB file 3-2266
- G468 Bellanca 7ECA Citabria 20 Aug 78 0 S Rockton, Ont. Canada.
Left undercarriage leg. MoT Canada file 080072.
- G469 Bellanca 7GCBC Citabria 15 Sep 78 0 S Thornton, Co. USA.
Left main wheel axle. Ref: NTSB file 3-2752.
- G470 Ted Smith Aerostar 601P 20 Sep 78 0 S Stansted, UK.
Torque links on both main gear legs. Ref: ICAO ADREP 439/78.
- G471 Cessna 402 27 Sep 78 0 S Indianapolis, Ind. USA.
Landing gear cylinder and trunnion. Ref: NTSB file 3-3777.
- G472 Beech D55 Baron 16 Dec 78 0 S Parafield SA. Australia.
Right gear, main retract braze rod end (threaded shank). Ref: Australia DoT
- G473 Transavia PL-12 Airtruk 1979 0 S Mudgee, NSW, Australia.
Right main gear, attach lugs. Ref: Australia.
- G474 Beech 95 Travel Air 1979 0 S Alice Springs, NT, Australia.
Worm shaft retaining collets. Ref: Australia.
- G475 Aero Commander 690 1979 0 S Perth WA, Australia.
Torque link shaft, right gear. Ref: Australia.
- G476 Cessna U206 4 Jan 79 0 S Atmautluak, Ak. USA.
Main landing gear. Ref: NTSB file 3-0392.
- G477 Convair 580 (Frontier) 19 Jan 79 0 S St. Louis, Mo. USA.
Nose gear drag strut. NTSB file 1-0018.
- G478 Cessna 185 Skywagon 6 Feb 79 0 S Granville Lake, Man. Canada.
Left gear attachment casting. Ref: MoT Canada file C90012.
- G479 Fokker F-27 (NLM) 10 Mar 79 0 S Birmingham Airport, UK.
Nose gear attachment lugs (corrosion pit). Ref: WAAS p. 7/79.
- G480 Cessna 180J (skis) 11 Mar 79 0 S Charlottetown, Lab., Canada.
2 bolts attaching right ski axle. Other 2 bolts had been missing. MoT Canada file A90007

LANDING GEAR (FIXED-WING)

- G481 Cessna A188B 5 May 79 0 S Newman, Cal. USA.
Right main strut. NTSB file 3-0835.
- G482 Vickers Viscount VC-2 25 May 79 0 S Cardiff Airport, Wales, UK.
(British Airways) Bolt in uplock mechanism of left gear.
Ref: WAAS p. 13/79.
- G483 Cessna 402B 9 Jun 79 0 S Kikaiga Island, Japan.
Welding fitting part, left main gear torque tube. Ref: Japan MoT.
- G484 Cessna 180 Skywagon 9 Jun 79 0 S Arthur North, Ont. Canada.
Right main gear leg at fuselage. 15,000 landings. Ref: MOT Canada file 090057.
- G485 Douglas DC-3C 22 Jul 79 0 S Tampa, Fla. USA.
Both arms of right gear, rear strut. Ref: NTSB file 3-3158.
- G486 Boeing 727 (Continental) 7 Aug 79 0 S El Paso, Tex. USA.
Down-lock rod. Ref: NTSB file 1-0021.
- G487 Boeing 737-100 (Wein Air Alaska) 18 Aug 79 0 S Dillingham, Ak. USA.
Port lower drag strut bolt. Intergranular corrosion from worn chrome plating. Corrosion & fatigue fracture. Ref: ICAO ADREP 230/79.
- G488 Cessna 402 8 Sep 79 0 S Adelaide, SA, Australia
Starboard gear torque tube bellcrank (mis-rigging). Ref: Australia DoT.
- G489 Boeing PT-17 13 Sep 79 0 S Shreveport, La. USA.
Left main gear. Ref: NTSB file 3-2193.
- G490 de Havilland DH-82A Tiger Moth 14 Oct 79 0 S Cypress, Tex. USA.
Eye on right axle assembly. NTSB file 3-2522.
- G491 Cessna 310 5 Dec 79 0 S Mackay, Qld. Australia.
Right gear uplock actuating rod. Ref: Australia
- G492 Cessna A188 1980 0 S Dorrigo, NSW, Australia.
Tailwheel assembly. Ref: Australia DoT.
- G493 Rockwell OV-10A Bronco (USAF) 1980 ? ? USA?
Nose gear fork at fillet radius just aft of jack point. Matl: 7075-T73 forging. Ref: Burns & Haines, USAF SA-ALC/MM-7588, p. 2.
- G494 Britten-Norman BN-2A Islander 6 Feb 80 0 S Mont Joli, Que. Canada.
Left oleo scissor link pin bolt. Exceeded 50-hour inspection. Ref: MOT Canada file Q00009.
- G495 de Havilland DHC-6 Twin Otter 7 Feb 80 0 S College Station, Tx. USA.
Right lower landing gear leg separated at Y-joint. Ref: NTSB file 3-3085.

G496 Cessna 185 Skywagon (skis)	29 Feb 80	0	S	Poplar Point, Sask. Canada. Left outboard landing gear support bracket. Ref: MOT Canada file C00012.
G497 Cessna 180 Skywagon (skis)	4 Mar 80	0	S	Cawdron Lake, Ont. Canada. Left main gear spring leg close to fuselage (fretting & galling). MOT Canada file 000018.
G498 Cessna 310I	7 Mar 80	0	S	Mammoth Lakes, Ca. USA. Right main landing gear support forging. Ref: NTSB file 3-0469.
G499 Cessna 185 Skywagon	14 Mar 80	0	S	Baie Johan Beetz, Que. Canada. Right ski support bracket. Ref: MOT Canada file Q00022.
G500 Cessna 185 Skywagon	15 Mar 80	0	S	Pikangikum, Ont. Canada. Right main gear support bracket Ref: MoT Canada file C00017.
G501 Stolp Starduster Too	5 Apr 80	0	S	Ashland, Oh. USA. Main gear, tubular structure at fuselage attachment point. Ref: NTSB file 3-0335.
G502 Champion 7ECA Citabria	6 Apr 80	0	S	Joliette Airport, Que. Canada. Main gear leg through-bolt (bolt undertorqued). Ref: MOT Canada file Q00028.
G503 Piper PA 31-310 Navajo	30 Apr 80	0	S	St. Hubert, Que. Canada. Front hinge of right inboard gear door. Origin: coarse grinding. Ref: MoT Canada file Q00035.
G504 Cessna 140A	30 Apr 80	0	S	Atlanta, Ga. USA. Right landing gear spring. NTSB file 3-0945.
G505 Douglas DC-6 (Zantop)	10 Jun 80	0	S	Indianapolis, In. USA. Nosewheel steering, upper torque link. Ref: NTSB file 1-0006.
G506 Piper J-3 Cub	13 Jun 80	0	S	Celt Lake, Ont. Canada. Left float attachment. Ref: MoT Canada file C00072.
G507 Swearingen SA-226A	16 Jun 80	0	S	Birmingham, Al. USA. Right main gear door uplock roller. Ref: NTSB file 3-2914.
G508 Cessna 402B	3 Jul 80	0	S	Van Nuys, Ca. USA. Right main landing gear side brace lock link. Ref: NTSB file 3-3580.
G509 Cessna U206	28 Jul 80	0	S	Kenai, Ak. USA. Nosewheel upper torque link assembly. Ref: NTSB file 3-3719.

LANDING GEAR (FIXED-WING)

G510 Helio H-250 Courier II	8 Aug 80	0	S Keith Bay, NWT. Canada. Wheel axle. Ref: MOT Canada file C00101.
G511 Aero Commander 690A	23 Sep 80	0	S Toledo, Oh. USA. Torque link shaft. Ref: NTSB file 3-2924.
G512 Aero Commander 600S-2R	1 Oct 80	0	S Kettleman City, Ca. USA. Tail wheel trunnion. Fatigue due to corrosion. NTSB file 3-3096.
G513 Cessna 170	4 Oct 80	0	S Wright, Wy. USA. Right landing gear axle. Ref: NTSB file 3-3354.
G514 Wittman Tailwind	4 Nov 80	0	S Payson, Az. USA. Modified fork shaft housing on tail wheel assembly at weld bead. NTSB file 3-3198.
G515 Cessna 150	27 Nov 80	0	S Alma, Que. Canada. Nosewheel fork collar (bolt holes). 5000 hours since new. Ref: MOT Canada file Q00122.
G516 Lockheed L1011 TriStar (Saudi Arabian)	23 Dec 80	2	S Near Qatar. Main landing gear, inboard wheel flange. Ref: ICAO ADREP 371/80.
G517 Douglas DC-8 (United)	29 Dec 80	0	S Phoenix, Az. USA. Stress corrosion fatigue failure of right main gear bogie beam. Ref: NTSB file 1-0014.
G518 Piper PA-23 Aztec	1981	0	S Wangi Stn, NT, Australia. Main gear drag link bolt. Ref: Australia DoT.
G519 Jodel D11	1981	0	S Camden NSW, Australia. Upper section of strut, left gear (weld). Ref: Australia DoT.
G520 Boeing 727	31 Jan 81	0	S Flushing, N.Y. USA. Fatigue fracture of reworked trunnion link at stress corrosion area. Ref: NTSB file 1-0011.
G521 Piper PA-22	28 Feb 81	0	S Knik Glacier, Ak. USA. Nosewheel assembly. Ref: NTSB file 3-0522.
G522 Bellanca 7ECA Citabria	4 Mar 81	0	S Snow Lake, Man. Canada. Ski axle (weld). Ref: MOT Canada file C10019.
G523 Piper PA-36-375 Pawnee Brave	14 Mar 81	0	S Geraldine, New Zealand. Left gear leg. Ref: NZ brief 81-033.
G524 Cessna 195	22 Mar 81	0	S Redwood Falls, Mn. USA. Right gear spring. Ref: NTSB file 3-0752.
G525 Cessna 185 Skywagon (skis)	28 Mar 81	0	S Lac Pletipi, Que. Canada. Right main gear support bracket (fatigue corrosion). Ref: MoT Canada file Q10023.

G526	Piper PA-18 Super Cub	22 Apr 81	0	S Fresno, Ca. USA. Main gear strut assembly rod. NTSB file 3-0626.
G527	Piper PA-28 Cherokee Cruiser	28 Apr 81	0	S Sept Iles, Que. Canada. Right main gear torque links, AD not complied with. Ref: MOT Canada file Q10031.
G528	Mooney M-20F Executive 21	2 May 81	0	S Hamilton, Ont. Canada. Nose gear steering shaft. Ref: MOT Canada file 010026.
G529	Boeing 707	11 May 81	0	S Kilgali/Kanombe Airport, Rwanda. Nose gear shaft. Stress-corrosion & fatigue crack. Origin: corrosion pit. Ref: Rwanda.
G530	Bellanca 8GCBC Scout	31 May 81	0	S St Andre Avellin, Que. Canada. "U" bolt, left main gear. Ref: MoT Canada file 81-Q10046.
G531	Piper PA 36- 375 Pawnee Brave	29 Jun 81	0	S Whana Whana, New Zealand. Left gear leg. Ref: NZ brief 81-061.
G532	Cessna 172N	30 Jul 81	0	S Glenville, W.V. USA. Main gear attachment bolt. NTSB file 3-1642.
G533	Cessna 170	3 Aug 81	0	S Middle Lake, Sask. Canada. Left axle. Ref: MOT Canada file C10091.
G534	Piper PA-34 Seneca	10 Aug 81	0	S Wenatchee, Wa. USA. Main landing gear. Ref: NTSB file 3-2726.
G535	Piper PA-18-125 Super Cub	18 Aug 81	0	S Burg Feuerstein, W. Germany. Main landing gear leg. Ref: W. German file 3X0442.
G536	Piper PA-38-112 Tomahawk	17 Sep 81	0	S Ardmore, New Zealand. Front clamping bolt, left gear leg. Ref: New Zealand brief 81-076.
G537	Cessna 180	27 Sep 81	0	S Corcoran, Mn. USA. Spring arm at upper 2 axle attach bolt holes. Ref: NTSB file 3-2792.
G538	Howard DGA-15 Nightingale	26 Oct 81	0	S Dryden, Ont. Canada. Left main gear upper strut. Ref: MOT Canada file C10136.
G539	Cessna 140	19 Nov 81	0	S Barrett Lake, Ca. USA. Right main gear strut at step attach bolt hole. Ref: NTSB file 3-3151.
G540	Champion 7ECA Citabria	20 Jan 82	0	S St. Jean, Que. Canada. Ski right gear leg at fuselage attachment (corrosion pits). Ref: MOT Canada file Q20008.

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LANDING GEAR (FIXED-WING)

G541 Cessna 140 22 Jan 82 0 S Kajaani, Finland.
(on skis) Left landing gear. Ref: Finland BoA.

G542 Britten- 20 Sep 82 0 S Sable Island, N.S. Canada.
Norman BN-2A Bulkhead to which nosegear was attached. Ref:
Islander MoT Canada file A20022.

Total Fatalities: 21

H-1
MISCELLANEOUS (FIXED-WING)

 * APPENDIX H *
 * *
 * FIXED-WING AIRCRAFT - MISCELLANEOUS *

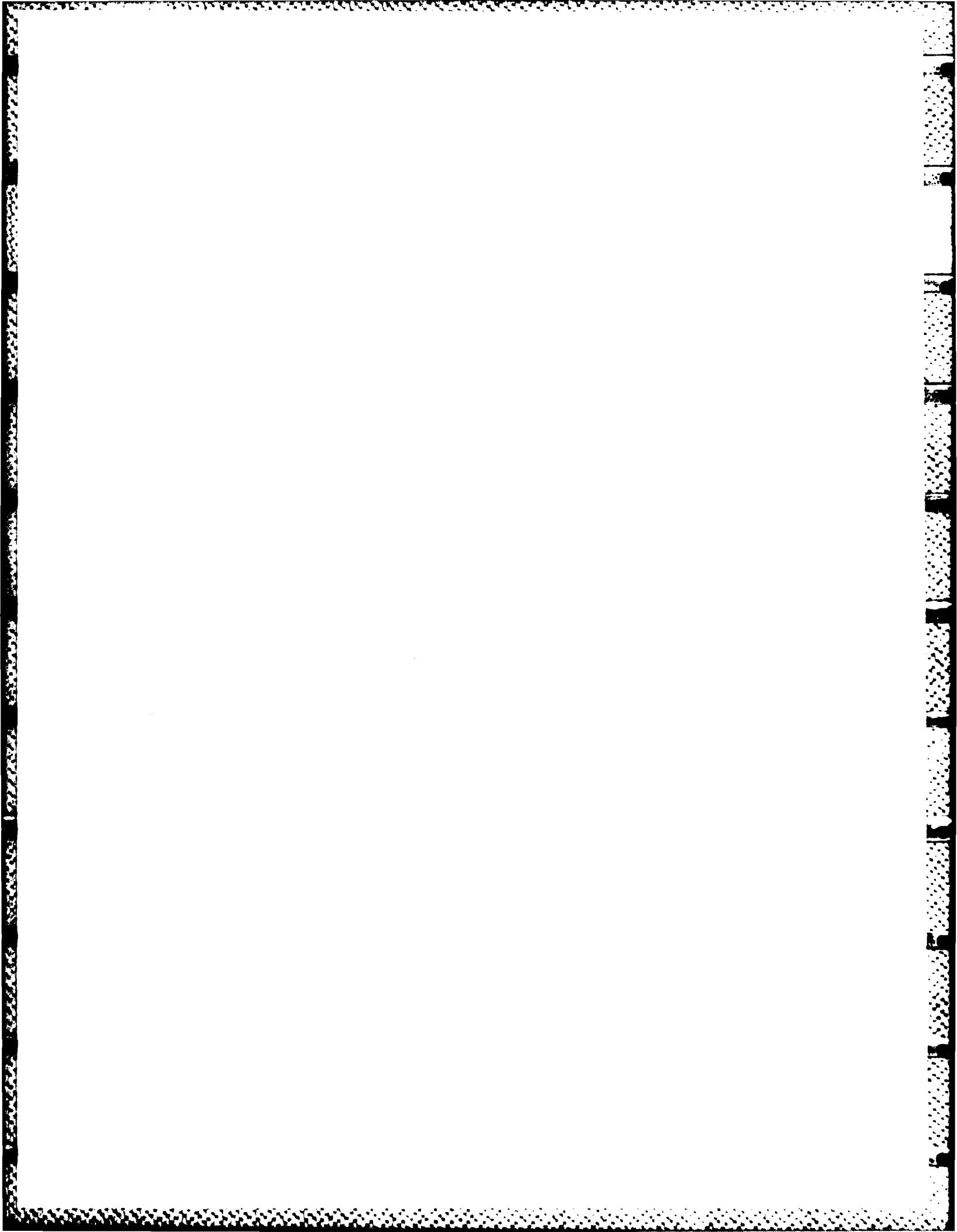
ID No.	Aircraft Type	Accident Date	No. Dead	D	Remarks
H1	N. American P-51 Mustang (USAF)	Mar 44	1	D	Boxted, Essex. UK. Engine mounting bolts. Engine separated. (Faulty heat treatment). Ref: Ethell, "Mustang - A Documentary History of the P-51", p. 63.
H2	Douglas DC-3 Dakota (Canadian Forces)	14 May 51	4	D	Lac Boltier, Que. Canada. Engine bearers & reduction gear housing cracked (origin: engine-mount welds). Ref: CF ACAIRS
H3	Zlin 326	1 May 63	1	D	Oulu Airport, Finland. During towing, sailplane's cylinder cap broke and pilot interrupted towing. While turning back to airport, aircraft crashed. Finland BoA
H4	Grumman G-73 Mallard	20 Mar 64	0	S	Key West Airport, Fla. USA. Main hydraulic pressure line tee fitting. Ref: NTSB file 2-0168.
H5	Grumman G-73 Mallard	20 Mar 64	0	S	West Palm Beach Airport, Fla. USA. Hydraulic line (tool damage). NTSB file 3-0817.
H6	Meyers MAC 145	2 May 64	0	S	Chicago, Ill. USA. Right brake master cylinder actuating rod. Ref: NTSB file 3-1127.
H7	Piper J-3C	4 Jul 64	0	D	Houston, Texas USA. Right brake pedal attaching lugs. Ref: NTSB file 3-1919.
H8	Boeing E-75 Stearman	12 Jul 64	0	S	Sherbrooke, Que. Canada. Engine attachment bolts. Ref: MoT Canada file F-341.
H9	Boeing E75N1 Stearman	13 Jul 64	0	S	Mercedes, Tex. USA. Engine tearaway. Engine structure: mount and vibration isolators. Ref: NTSB file 3-2055.
H10	Fairey Gannet (RAN)	23 Mar 65	1	D	At sea, HMAS Melbourne. Bill of arrestor hook broke during arrested landing. Ref: Royal Australian Navy.
H11	Piper PA-22	5 Jul 65	0	S	Underwood, Wash. USA. Master brake cylinder diaphragm. NTSB file 3-2517

H-2

MISCELLANEOUS (FIXED-WING)

- H12 Cessna 180 3 Sep 65 0 S Tarentum, Pa. USA.
Left brake. Ref: NTSB file 3-2487.
- H13 Lake LA-4 16 Sep 67 0 S Flesherton, Ont. Canada.
Propeller governor oil line tube (fretting)
caused engine oil starvation. Ref: MoT Canada
file 3612.
- H14 Beech A23 5 Dec 67 0 S Chamblee, Ga. USA.
Both brake castings. Ref: NTSB file 3-4376
- H15 N. American 3 Jan 68 1 ? Ubon, Thailand.
F-86 Sabre
(Royal Australian AF) Bolt in engine intake. Bolt head ingested by
engine. Ref: Australia Dept. of Defence.
- H16 Cessna 195A 5 Dec 68 0 S Paso Robles, Cal. USA.
Left brake actuating rod. Ref: NTSB file 3-4213
- H17 Cessna 210 1970 0 S Archerfield, Qld. Australia.
Hydraulic line. No fluid to lower gear. Ref:
Australia DoT.
- H18 Cessna 182 30 Aug 70 0 S Carey, Id. USA.
Right brake line broken adjacent to step. Ref:
NTSB file 3-3454.
- H19 Lockheed 29 Sep 71 0 S Altus AFB, Okla., USA.
C-5A Galaxy
(USAF) Engine pylon fatigue failure during ground runup.
Outboard truss member in aft pylon mount. Ref:
Ref: AWST 8 Nov 71, p. 19
- H20 C.A.C. Austrl.
CA-28C Ceres 1973 0 S Leeton NSW, Australia.
Port brake line at work hardened area. Ref:
Australia DoT.
- H21 Aero 18 Apr 76 0 S Chicago, Ill. USA.
Commander 685 Hydraulic system. Origin: points of increased
diameter and interior disturbances in tubing.
Loss of brakes and flaps. NTSB file 3-2685.
- H22 Saab-Scania 15 Nov 76 0 D Edsbyn, Sweden.
SK37 Viggen
(Swedish Air Force) Attachment of engine front cowl. Ref: Swedish
AF.
- H23 Cessna A188B 1977 0 S Quairading, WA, Australia.
Crack in port brake line. Ref: Australia DoT.
- H24 Grumman G-164 1977 0 S Wee Waa NSW, Australia.
AgCat Aircraft ground looped. Left leg detached.
Flexible hose from brake master cylinder in
perished condition. Ref: Australia DoT.
- H25 Saab-Scania 10 Mar 77 0 D Västervik, Sweden.
SH37 Viggen
(Swedish Air Force) Heat shield in engine. Ref: Swedish AF.

H26 Boeing 707-100 (American)	5 Apr 77	0	S St. Louis, Mo. USA. No. 3 pylon mid-spar attachment fitting. Pylon & engine separated. Ref: ICAO ADREP 1311/77; WAAS p. 11/77.
H27 Saab-Scania S35E Draken (Swedish Air Force)	6 Apr 77	0	D Nykoping, Sweden. Support profile in engine exhaust. Ref: Swedish AF.
H28 Cessna 320 Skynight	8 Aug 77	0	S Tsuniah Lake, B.C. Canada. Fuel vent line nipple. Ref: MoT Canada file P70907.
H29 Scheibe Bergfalke-III	9 Aug 77	0	S Unterwoessen, W. Germany. Clutch support structure strut assembly. Ref: W. German file 3X0424.
H30 AESL 115/A2 Airtourer	1978	0	S Bamawn Vic., Australia. Brake line. Ref: Australia DoT.
H31 Cessna 182M	1978	0	S Bunbury WA, Australia. Broken brake cable. Ref: Australia DoT.
H32 Piper PA-23 Aztec	18 Jan 79	3	D Scottown, Ohio USA. Left engine propeller governor oil line failed. Wrong part. Aluminum tube used, and manufacturer specified steel. Ref: NTSB file 3-2488.
H33 McDonnell Douglas DC-10 (American Airlines)	25 May 79	273	D Chicago, Ill. USA Pylon failed & engine separated. Crack caused by faulty maintenance & propagated by fatigue. Airframe hours: 19,871. Ref: AWST Feb. 11/80
H34 Boeing 747-121 (Pan American)	27 Dec 79	0	S Heathrow Airport, London, England. Pylon forward bulkhead of #4 engine. Crack on Inconel horse collar chord. Initiation maybe from prior collision with baggage container. Ref: AWST 30 Nov 81 p 149-
H35 Piper PA-22-108	13 Jan 80	0	S Groblersdal, Republic of South Africa. Brake pressure pipe at master cylinder. Origin: belling of pipe. Ref: South Africa DoT.
H36 Robin DR 400	28 Jun 81	0	S Bad Neuenahr, W. Germany. Engine mount. Ref: W. German file 3X0284.
H37 R.F.C. Skyrider 20 (ultralight)	4 Jul 82	2	D Clappisons Corners, Ont. Canada. Propeller driveshaft rear bearing lower housing. Ref: Canadian Ultralight News, Feb/83, p 2



PART II
LISTING BY AIRCRAFT TYPE

APPENDIX I

LIST OF FIXED-WING ACCIDENTS - ORDERED BY AIRCRAFT TYPE

ID No.	Aircraft Type	Accident Date	No. a Dead m	D	Remarks
<u>AERO COMMANDER A-9 AC COMMANDER (See CallAir A-9)</u>					
<u>AERO COMMANDER 100 DARTER COMMANDER</u>					
	<u>Propeller</u>				
F123	Aero Commander 100	8 Jun 73	0	S Albany, N.Y. USA. Propeller blade (7" from tip).	
	<u>Engine</u>				
E269	Aero Commander 112A	21 Aug 76	0	D Santa Ana, Calif. USA. Throttle-power lever assembly.	
	<u>Propeller</u>				
F159	Aero Commander 112A	5 Nov 75	0	D McFarland, Calif. USA. About 6 inches of propeller separated.	
	<u>Engine</u>				
F178	N. American Rockwell 112	31 Dec 76	0	S Wildorado, Tex. USA. Propeller blade. Hartzell prop HC-E2YR-1B, blade model F7666A.	
<u>AERO COMMANDER 200 (MEYERS 200)</u>					
	<u>Engine</u>				
E32	Meyers 200B	17 Feb 64	0	S Cleveland, Ohio. USA. No. 5 cylinder failed around the head.	
	<u>Propeller</u>				
E126	Aero Commander 200-D	30 Apr 70	0	S Woodstock, Ga. USA. No. 2 conrod.	
	<u>Propeller</u>				
F79	Meyers 200A	2 Aug 69	0	S Vacaville, Cal. USA. Propeller came off, 4 prop hub bolts evidence prior damage.	
	<u>Engine</u>				
F129	Meyers 200B	14 Nov 73	0	S Savannah, Ga. USA. Propeller (origin: root of top outboard th	

AIRCRAFT TYPE (FIXED-WING)

Landing Gear

G54 Meyers 200A 22 Apr 64 0 S Washington, D.C. USA.
Nose wheel fork broken.

G135 Meyers 200A 23 Oct 65 0 S Hawthorne, Cal. USA.
Left gear lower torque link and down lock link.

AERO COMMANDER 500/520/560/680/681/685/690Wing

A62 Aero Commander 680S 21 Nov 61 6 D Mount Ruapehu, New Zealand.
Separation of right wing. Lower spar cap, front spar at WS 24. Upper & lower rear spar caps had failed sometime previously from single load of unknown origin. Airframe hours: 5040

A73 Aero Commander 680E 1 Apr 64 4 D Thompson, Man. Canada.
Right wing separated. Front spar lower cap, WS 24. Airframe hrs: 5949. Role: low-level survey.

A81 Aero Commander 560E 27 Sep 67 7 D Dallas, Texas USA.
Left wing failure (spar). Two overlapping rivet holes found in aft leg of spar cap.

Window

C22 N. American Commander 681B 23 Feb 77 0 S Ft. McMurray, Alta. Canada.
Co-pilot's window shattered. Crazing on outer surface. Subsequent pressurization cycles caused fatigue rupture. 1769 airframe hours.

Engine

E54 Aero Commander 680 21 Jun 65 0 S Cleveland, Ohio. USA.
No. 4 cylinder.

E91 Aero Commander 560E 21 Feb 67 4 D Tahoe Valley, Calif. USA.
Impulse coupling cam assembly on magnetos.

E172 Aero Commander 680E 9 Aug 72 0 S Cambridge, Ohio. USA.
Crankshaft (3rd order counterweight ears).

E323 Aero Commander 680 28 Dec 78 1 D Oklahoma City, Okla. USA.
Conrod in left engine.

Propeller

F98 Aero Commander 500B 21 Jun 71 0 S Crossett, Ark. USA.
Right prop hub spider.

F102 Aero Commander 500B 18 Aug 71 0 S Newport, R.I. USA.
Left prop blade (hub clamp).

F122 Aero Commander 500B 1 Jun 73 0 S Crownpoint, N. Mex. USA.
Propeller: blade retention mechanism

F172 N. American Commander 500 12 Jul 76 0 S Kamloops, B.C. Canada.
Right propeller blade shed (corrosion pits).

F192 Aero Commander 500 4 Apr 78 0 S Miami, Fla. USA.
Left propeller blade separated.

<u>Landing Gear</u>						
G56	Aero Commander 560	27 Apr 64	0	S	Paducah, Ky. USA. Nose gear extension bolt.	
G60	Aero Commander 520	20 May 64	0	S	Indianapolis, Ind. USA. Nosewheel torque knee scissors.	
G73	Aero Commander 520	30 Aug 64	0	S	Morristown, N.J. USA. Nose wheel fork.	
G141	Aero Commander 520	8 Nov 65	0	S	Minneapolis, Minn. USA. Down lock and retract assembly. P/N 4730005.	
G143	Aero Commander 520	17 Nov 65	0	S	Oklahoma City, Okla. USA. Right main wheel axle.	
G163	Aero Commander 520	28 Mar 66	0	S	Muskogee, Okla. USA. Nose gear body assembly. P/N 4750022.	
G194	Aero Commander 520	14 Oct 66	0	S	Houma, La. USA. Nose wheel fork (bolt holes).	
G475	Aero Commander 690	1979	0	S	Perth WA, Australia. Torque link shaft, right gear.	
G511	Aero Commander 690A	23 Sep 80	0	S	Toledo, Oh. USA. Torque link shaft, PN ED12406-1, failed on both ends.	
<u>Miscellaneous</u>						
H21	Aero Commander 685	18 Apr 76	0	S	Chicago, Ill. USA. Hydraulic system. Origin: points of increased diameter and interior disturbances in tubing. Loss of brakes and flaps.	

AERO COMMANDER S-2 SNOW COMMANDER (See Snow S-2)

AERO COMMANDER 600 S-2R THRUSH COMMANDER

<u>Engine</u>						
E133	Aero Commander S-2R	27 Jun 70	0	S	Eudora, Ark. USA. Main governor drive gear sheared.	
E216	Aero Commander 600S-2R	17 Aug 74	0	S	Lake Providence, La. USA. Exhaust side of no. 4 cylinder head.	
E217	Aero Commander S-2R	3 Sep 74	0	D	Kuopio, Finland. Connecting rod.	
E261	Aero Commander 600S-2R	6 May 76	0	S	Hermiston, Ore. USA. Impeller shaft.	
E393	N. American S-21 Thrush Commander	23 Jul 81	0	S	Fox Creek, Alta. Canada. No. 1 cylinder, fillets between cooling fins around exhaust valve ear. Pratt & Whitney R-1340 engine.	

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AIRCRAFT TYPE (FIXED-WING)

E396 Rockwell S-2R	5 Aug 81	0 D	Clarksburg, Ca. USA. Cylinder assembly.
E400 Aero Commander S-2R	4 Oct 81	0 S	Bakersfield, Ca. USA. No. 1 cylinder at end of threaded area, cylinder barrel top.

Propeller

F194 Aero Commander S-2R	28 Apr 78	0 S	Stringtown, Ms. USA. Propeller blade.
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F211 Rockwell Thrush Commander	2 Jun 79	0 S	Lottery, Jamaica. Propeller blade.
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Landing Gear

G512 Aero Commander 600S-2R	1 Oct 80	0 S	Kettleman City, Ca. USA. Tail wheel trunnion, P/N 5508-19. Fatigue due to corrosion.
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AERONCA 7AC CHAMPION

E58 Aeronca 7AC Champion	10 Aug 65	0 S	Warrington, Pa. USA. No. 2 cylinder exhaust valve.
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E97 Aeronca 7AC Champion	15 Aug 67	0 S	Commerce, Tex. USA. Loose prop retainer nut caused cracking of crankshaft.
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Landing Gear

G127 Aeronca 7AC Champion	7 Sep 65	0 S	Ronan, Mont. USA. Landing gear stuffing box (improper weld).
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AERONCA 7GCBC CITABRIA (See Champion Citabria)

AERONCA SUPER CHIEF

G330 Aeronca 11AC Super Chief	18 Jul 72	0 S	Two Harbors, Minn. USA. Left front landing gear fitting lug (bolt holes).
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AEROSPATIALE CARAVELLE

E272 Aerospatiale Caravelle	12 Oct 76	95 D	Bombay, India. Disintegration of 10th compressor stage of Rolls Royce Avon engine.
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Landing Gear

G50 Sud Aviation Caravelle	17 Mar 64	0 S	Copenhagen, Denmark. Nose wheel axle (steel).
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G185 Sud Aviation SE-210 Caravelle	22 Aug 66	0 S	Newark, N.J. USA. Nose wheel axle spindle (improperly shot- peened).
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G370 Aerospatiale Caravelle 10B3	15 Mar 74	16 D	Tehran, Iran. Failure of attachment fitting of main undercarriage caused collapse of the gear, rupture of the main fuel tank, and a fire.
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AESL AIRTOURER

H30 Brake Line AESL 115/A2 1978 0 S Bamawn Vic., Australia.
Airtourer Brake line.

AIRBUS INDUSTRIE A300

E404 Engine Airbus Ind. 17 Mar 82 0 D Sanaa Airport, North Yemen.
A300 H. p. turbine disk failed, fillet radius. GE CF6-50 engine.

AIRSPEED AMBASSADOR

D19 Flaps Airspeed 3 Jul 68 6 D Heathrow Airport, London England.
Ambassador Failure of port flap operating rod, permitting AS.57 Series 2 flap to retract.

G23 Landing Gear Airspeed 3 Mar 60 0 S Woolsington Airport, UK.
Ambassador Port landing gear down-lock latch plate.

AIRTOURER (See AESL Airtourer)

AMERICAN AA-1 YANKEE (TRAINER, T-CAT, LYNX)

D29 Flight Controls Grumman 31 Jul 75 0 S St. Andrews, Man., Canada.
AA-1B Left rudder centering spring.

F95 Propeller American 2 May 71 0 S Fort Myers, Fla. USA.
AA-1 Yankee 5 1/8" prop blade missing.

F117 American 30 Dec 72 0 S Show Low, Ariz. USA.
AA1-A Propeller blade.

F147 Grumman 25 May 75 0 S Tampa, Fla. USA.
American AA-1B 4" blade tip shed (pits on leading edge).

F169 American 27 Apr 76 0 S Gorman, Cal. USA.
AA-1B Propeller (nick).

G241 Landing Gear American 21 Nov 68 0 S Bayport, N.Y. USA.
AA-1 Yankee Nose gear strut above fork attach point.

AMERICAN AA-5

E211 Engine American 16 Jun 74 0 S Chula Vista, Cal. USA.
AA-5 Carb heat control cable.

E320 Grumman 4 Oct 78 2 D Littleton, Colo. USA.
American AA-5 #3 cylinder at metal folds between barrel fins.

ARMSTRONG WHITWORTH ARGOSY

Landing Gear

G39 Armstrong Whitworth Argosy 2 Jul 62 0 S Wilmington, Del. USA.
Lower attach fitting of right gear drag strut.
Origin: Upper rear corner radius.

G379 Hawker Siddley Argosy 650 8 Jul 74 0 S Point Hope, Alaska, USA.
Port landing gear (stress corrosion cracking and fatigue).

AUSTER J1B

Landing Gear

G439 Auster J1B-L 1977 0 S Murray Bridge, SA, Australia.
Landing gear radius rod.

AUSTER 3F

Landing Gear

G344 Auster 3F 1973 0 S South Marulan NSW, Australia.
Radius rod, right gear.

G345 Auster 3F 1973 0 S Singleton NSW, Australia.
Broken weld, stub axle fitting, right gear.

G391 Auster 3F 1975 0 S Warkworth NSW, Australia.
Port gear gusset plate (poor weld).

AUSTER 5D

Engine

E142 Auster 5D 1971 0 S Camden NSW, Australia.
Valve assembly.

AUSTER 5J1

Engine

E284 Auster 5J1 2 Jul 77 0 S Dorsten-Wulfen, W. Germany.
Crankshaft.

AVRO CF-100 CANUCK

Engine

E10 Avro CF-100 11 Aug 53 2 D St-Hubert, Que. Canada.
Canuck
(Canadian Forces) Failure of a Banjo bolt fitting in fuel system of starboard engine caused double flameout.

Flaps

D2 Avro CF-100 21 Apr 54 2 D North Bay, Ont. Canada.
Canuck
(Canadian Forces) Outboard hinge bracket of starboard flap.

D3 Avro CF-100 19 Jun 56 2 D Bagotville, Que. Canada.
Canuck
(Canadian Forces) Outboard hinge bracket of starboard flap. Flap separated.

D22 Avro CF-100 3 Mar 72 0 D Mt. Tremblant Park, Que. Canada.
Canuck
(Canadian Forces) Aileron trimmer tab fitting failed (fatigue and stress corrosion).

BARRETT CASSUT

F84 Propeller
 Barrett Cassut 28 Aug 69 1 D McCordsville, Indiana USA.
 Propeller.

BAYLES

A127 Wing
 Bayles Special 1 13 Oct 79 2 D Jackson, Tenn. USA..
 Separation of wing. Bolt holding rear strut to fuselage failed.

BEECH 18/C-45

A27 Wing
 Beech D18C 6 Dec 47 2 D Wellsburg, W. Virginia, USA.
 Wing failure. Lower spar cap steel tube at toe of weld, right outboard wing panel.

A75 Beech G18S 16 Jul 64 4 D Toadlena, New Mexico, USA.
 Wing failure, WS 81.

A78 Beech C-18S 15 Aug 66 4 D Anchorage, Alaska USA.
 Right wing failed. Fracture adjacent to landing gear slide cluster.

A79 Beech C-45H 28 Feb 67 2 D Middletown, Del. USA.
 Left wing failure. Lower cap of spar at weld approx 8 inches outboard of outer panel attach point.

A82 Beech E18S 28 Apr 67 1 D Acworth, Georgia USA.
 Wing failure at WS 81, lower left spar (elliptical steel tube).

A102 Beech E18S 22 Jun 72 1 D Cleveland, Ohio USA.
 Left wing separated. Lower spar cap, WS 81. Crack missed during prior inspection.
 Airframe hours: 8227

A107 Beech E18S 19 Apr 73 6 D Davenport, Iowa USA.
 Separation of right wing. Lower spar cap, WS 81, at weld in spar. Crack missed in previous inspections.

A110 Beech D18S 16 Oct 73 1 D Thompson, Man. Canada.
 on floats Separation of wing. Left wing lower spar cap.
 Crack undetected in prior x-ray.

C17 Fuselage
 Beechcraft C-45H 12 Nov 65 0 S San Juan, P.R. USA.
 Right and left flanges of bulkhead P/N 248 cracked, allowing nose gear drag leg to retract.

D12 Flight Controls
 Beech C-45H 3 Mar 67 0 S Janesville, Wis. USA.
 Fabric separation at elevator trim tab hinge and elevator-horizontal stabilizer hinge areas.

AIRCRAFT TYPE (FIXED-WING)

	<u>Engine</u>				
E63	Beechcraft C-45H	11 Oct 65	0	S Kauai, Hawaii. USA. Fuel line to carburettor at fitting to carb.	
E99	Beech E18S	8 Jan 68	3	D San Diego, Calif. USA. Cracked shroud, 3rd stage stator assembly.	
E237	Beech E18S	26 Jun 75	2	D Toledo Ohio, USA. Fatigue - cylinder head. Unapproved mod. Standpipe cut off flush with bottom of oil tank	
E290	Beech E18S	22 Aug 77	2	D Catalina Island, Calif. USA. Cracks in combustion heater allowed fumes into cockpit.	
E307	Beech 18	19 Jun 78	0	D Windsor Locks, Ct. USA. No. 2 bearing of no. 1 engine failed. No. 2 power turbine blade failed.	
	<u>Propeller</u>				
F20	Beechcraft E18S	16 Sep 64	0	S Fort Lauderdale, Fla. USA. Propeller blade.	
F23	Beech E18S	3 Jan 65	4	D Henderson, Ky. USA. Engine tear-away after in-flight separation of no. 1 propeller blade.	
F45	Beech D18S	10 Feb 67	3	D Dallas, Texas USA. Propeller blade at shank radius.	
F141	Beech E18S	7 Oct 74	0	S Topeka, Kans. USA. Prop failure, right engine (wrong crankshaft counterweight combination installed).	
F185	Volpar H18	20 Jul 77	0	S Galena, Alas. USA. Propeller pitch changing mechanism.	
F188	Beech E18S	1 Oct 77	0	D Plymouth, In. USA. Propeller (nick)	
	<u>Landing Gear</u>				
G132	Beechcraft C-45H	1 Oct 65	0	S Killeen, Tex. USA. Landing-gear rocker arm switch.	
G162	Beech C-45G	23 Mar 66	0	S Kanapali, Hawaii. USA. Nose gear attach points.	
G242	Beech E18S	20 Dec 68	0	S Los Angeles, Cal. USA. Attach screw to push rod assembly.	
G247	Beech E18S	5 Feb 69	0	S La Crosse, Wis. USA. Landing gear slide tube. (Lubricant deteriorated in idler sprocket bearing).	
G250	Beech C-45G	21 Mar 69	0	S Fort Lauderdale, Fla. USA. Nose gear fork.	

G253 Beech G18S	5 May 69	0	S Tulsa, Okla. USA. Right main gear drag leg (weld). P/N 404-188405-6
G281 Beech E18S	3 Oct 70	0	S Anniston, Ala. USA. Main landing gear support assembly.
G348 Beech D18S	14 Mar 73	0	S Oakland, Cal. USA. Right hand drive shaft support bracket of nose gear.
G356 Beech C-45H	17 Aug 73	0	S Los Angeles, Cal. USA. Right brake froze due to worn brake puck, overstressed weakened right drag link of main gear.
G396 Beech D18	6 Mar 75	0	S St. Thomas, Virgin Islands. Tail wheel truss.
G447 Beech D18S	22 Jul 77	0	S Bemidji, Minn. USA. Gear collapsed, bolt P/N 404-188466.

BEECH BARON (TRAVEL AIR, COCHISE)

<u>Engine</u>			
E263 Beech 95-B55 Baron	29 May 76	4	D Holly Springs, Miss. USA Camshaft gear teeth failed, crack in undersized radii at gear teeth roots.
E266 Beech 58 Baron	3 Aug 76	6	D Chillicothe, Mo. USA. Crankshaft at crack in no. 7 crankcheek.
E326 Beech 58P Baron	29 Jan 79	0	S Amarillo, Tex. USA. Crankshaft.
E327 Beech 58 Baron	5 Feb 79	0	S Kalgoorlie WA, Australia. No. 3 cylinder inlet valve.
E373 Beech 55 Baron	10 Dec 80	0	S Edmonton, Alta. Canada. No. 6 cylinder - piston con rod through I-beam section. Fatigue initiated as a result of rod having been bent by hydraulic lock.
<u>Propeller</u>			
F14 Beech A55 Baron	30 Jan 64	0	S Kansas City, Mo. USA. Propeller (threaded area of shank).
F30 Beech 95-B55 Baron	6 Jun 65	0	S Schenectady, N.Y. USA. Right engine propeller mounting bolts.
F109 Beech 95 Travel Air	5 Apr 72	1	D Miami, Fla. USA. Right prop blade failed 1 inch from base of shank.
F131 Beech 95-B55 Baron	29 Jan 74	0	S Goodyear, Ariz. USA. Propeller hub.
F181 Beech 95-C55 Baron	25 Mar 77	0	S Mackay Qld., Australia. Propeller hub. 100 hr check not done.

AIRCRAFT TYPE (FIXED-WING)

F182 Beech T-42A 25 May 77 0 D Al. USA.
 Cochise
 (US Army) No. 1 propeller hub assembly. McCauley 2AF34C55
 propeller.

F221 Beech 95-B55 17 Jul 80 0 S Malden, Mo. USA.
 Baron Hartzell prop hub clamp, Model PHC-A3VF-2B/
 V7636NB.

F232 Beech 58 27 Oct 81 0 S Selma, Al. USA.
 Baron McCauley prop hub, P/N D2AF34C30N.

Landing Gear

G301 Beech 95-C55 1971 0 S Dampier WA, Australia.
 Baron Nose gear, plunger rod assembly (fork end bolt
 holes).

G393 Beech 58 1975 0 S Townsville Qld. Australia.
 Baron Retract rod ball end.

G431 Beech 95 13 Jun 76 0 S Wallkill, N.Y. USA.
 Baron Nose gear aft drag brace.

G434 Beech 95-C55 24 Aug 76 0 S Perth WA, Australia.
 Baron Nose gear actuator arm P/N 35-825 172-2.

G453 Beech 58 15 Nov 77 0 S Archerfield Qld., Australia.
 Baron Nose gear retract rod at ball joint fitting.

G472 Beech D55 16 Dec 78 0 S Parafield SA. Australia.
 Baron Right gear, main retract braze rod end P/N AHM6
 (threaded shank)

G474 Beech 95 1979 0 S Alice Springs, NT, Australia.
 Travel Air Worm shaft retaining collets.

BEECH BONANZA

Wing

A61 Beech 35 25 Mar 61 1? D Brookfield, Mass. USA.
 Bonanza Wing failure. Centre-section steel truss.

A63 Beech 35 30 Sep 62 1? D Parsons, Kansas USA.
 Bonanza Wing failure. Centre-section steel truss.

A68 Beech 35 13 May 63 1? D Perry, Oklahoma USA.
 Bonanza Left wing failure. Forward centre-section
 steel truss at wing-fuselage attachment.
 Material: steel. Airframe hours: 4132.

Engine

E64 Beech 35 12 Oct 65 0 S Carlsbad, Cal. USA.
 Bonanza Magneto switch.

E79 Beech 35 10 Apr 66 0 S Texico, N.Mex. USA.
 Bonanza Carburetor alternate air door hinge.

E153 Beech A35 Bonanza	8 Oct 71	0	S Campo, Cal. USA. # 2 cylinder hold-down studs. Under-torqued during overhaul.
E158 Beech M35 Bonanza	23 Nov 71	0	S Owosso, Mich. USA. Crankshaft.
E171 Beech V35 Bonanza	19 Jul 72	0	S Oneill, Neb. USA. Alum nipple P/N AN816-6D broke at turbocharger attaching point.
E183 Beech M35 Bonanza	1973	0	S Morwell Vic. Australia. Crankshaft (by no. 2 connecting rod journal).
E184 Beech P35 Bonanza	1973	0	S Mansfield Vic., Australia. Connecting rod bearing.
E212 Beech P35	30 Jun 74	0	D Tutelake, Calif. USA. No. 1 conrod bolt.
E222 Beech H35 Bonanza	1 Dec 74	3	D Hayward, Calif. USA. Crankshaft. Wrong propeller installed.
E224 Beech V35 Bonanza	20 Dec 74	0	S St. Paul, Minn. USA. No. 5 connecting rod bolts.
E251 Beech 36 Bonanza	1976	1	D Australia. Engine crankcase adjacent to cylinder attachment stud holes.
E256 Beech V35 Bonanza	31 Jan 76	0	S Kings Park, N.Y. USA. Crankshaft NR639243.
E285 Beech 35 Bonanza	13 Jul 77	0	S Clinton, Iowa. USA. Two supporting base studs of #2 cylinder.
E289 Beech P35 Bonanza	21 Aug 77	1	D Pittsburgh, Penn. USA. Crankshaft (crack in area where bearing rotated)
E311 Beech M-35 Bonanza	2 Jul 78	0	S Riveredge, Ohio. USA. Fuel injection system fracture. Flow divider diaphragm and shaft cup seal aged.
E321 Beech 36 Bonanza	10 Nov 78	0	S Unalakleet, Alas. USA. Crankshaft.
E343 Beech A36 Bonanza	10 Sep 79	0	S Cincinnati, Ohio. USA. Crankshaft.
E344 Beech N35 Bonanza	11 Sep 79	1	D Olean, N.Y. USA. Crankshaft failed at crack 80% thru long crankcheek between no. 1 & no. 2 crank pins
E345 Beech 36 Bonanza	21 Sep 79	0	S Bassett, Ne. USA. Crankshaft.

AIRCRAFT TYPE (FIXED-WING)

E376	Beech F33A Bonanza	3 Jan 81	0	S St. Paul, Mn. USA. Poor quality control. No radius on fillet of camshaft where undercut for oil holes. Also undercut 0.005".
F60	<u>Propeller</u> Beech S35 Bonanza	22 Oct 67	0	S Baton Rouge, La. USA. Propeller (improper heat treated blade and hub workmanship at time of manufacture)
F64	Beech N35 Bonanza	13 Nov 67	1	D Camden, Ark. USA. Both control bolts of propeller hub.
F66	Beech V35 Bonanza	17 Jan 68	0	S Dell Rapi�s, S.Dak. USA. Propeller cylinder attach screws. Propeller in service approx. 170 hr.
F85	Beech K35 Bonanza	5 Sep 69	4	D Provo, Utah USA. Propeller separation (prop pitch control bolts)
F110	Beech M35 Bonanza	12 May 72	1	D Florissant, Mo. USA. Propeller pitch-change bolts.
F134	Beech 35 Bonanza	24 Jul 74	0	S Bellevue, Tex. USA. Propeller blade (near blade shank).
F151	Beech J35 Bonanza	1 Jul 75	0	S Sparta, Ky. USA. Prop blade pitch control bolts. P/N 278-336.
F164	Beech V35 Bonanza	30 Jan 76	2	D Meigs, Ga. USA. No. 2 prop blade actuating pin.
F191	Beech S35 Bonanza	19 Mar 78	4	D Carrabassett, Maine USA. 6 inches of propeller blade separated.
F199	Beech V35 Bonanza	4 Jun 78	0	S East Jordan, Mich. USA. No. 2 blade actuating pin.
F201	Beech V35 Bonanza	11 Jun 78	0	S Jackson Hole, Wy. USA. Prop. AD not complied with.
F222	Beech F33A Bonanza	1 Oct 80	0	S Arlington, Az. USA. Propeller blade.
G62	<u>Landing Gear</u> Beech 35 Bonanza	12 Jun 64	0	S Piedmont, Okla. USA. Nosegear retract actuator arm.
G119	Beech B35 Bonanza	14 Jul 65	0	S Carnegie, Okla. USA. Lower nose gear drag leg bolt.
G128	Beech 35-33 Bonanza	9 Sep 65	0	S Omaha, Neb. USA. Nose gear hydraulic actuating cylinder shaft.
G212	Beech J35 Bonanza	31 May 67	0	S Lufkin, Tex. USA. Nose gear push-pull rod end (threaded area).

G223 Beech A35 Bonanza	19 Nov 67	0 S Visalia, Cal. USA. Nose gear actuator retract arm. P/N 35-825172-2.
G308 Beech 35 Bonanza	20 Jun 71	0 S Golts, Md. USA. Nose wheel fork (weld). Operated from rough strip.
G367 Beech H35 Bonanza	6 Jan 74	0 S Canyon, Tex. USA. Rebuilt nose gear brace assembly.

BEECH TWIN BONANZA

<u>Engine</u> E35 Beechcraft C50	14 May 64	0 S Concord, N.H. USA. High pressure fuel line.
<u>Propeller</u> F63 Beech B50 Twin Bonanza	3 Nov 67	0 S McAllen, Tex. USA. 6 1/2" broke off blade, left propeller.
<u>Landing Gear</u> G165 Beech B50 Twin Bonanza	6 Apr 66	0 S Jackson, Miss. USA. Nose gear jack screw mounting.
G201 Beech D50 Twin Bonanza	15 Mar 67	0 S Birmingham, Ala. USA. Nose gear shimmy damper jammed, failed nose gear
G266 Beech E50 Twin Bonanza	1970	0 S Katherine NT, Australia. Nose gear retract mechanism.

BEECH 60 DUKE

<u>Landing Gear</u> G401 Beech 60A Duke	23 Jul 75	0 S Duesseldorf, W. Germany. Wheel rim of left main landing gear.
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BEECH 90 KING AIR

<u>Wing</u> A124 Beech A90 King Air	1 May 79	2 D Sherrington, Que. Canada. Right wing separated. Bathtub fitting, P/N 50110057, joining centre section to outer wing. Matl: 2014-T6. Role: low-level navaid calibration. Airframe hours: 5466
A137 Beech E90 King Air	26 Oct 81	1 D Mineral Wells, Texas USA. Left wing separated. Lower-wing forward attachment bolt failed from fatigue corrosion.

BEECH MUSKETEER (SIERRA, SUNDOWNER, SPORT)

<u>Engine</u> E147 Beech 23 Musketeer	16 May 71	0 S Yuma, Ariz. USA. Aux fuel pump fitting (prior partial fracture).
E191 Beech A23 Musketeer	8 Apr 73	0 S Eden Prairie, Minn. USA. Dowel pin, all starter gear and crankshaft gear attach bolts broken.

I-14

AIRCRAFT TYPE (FIXED-WING)

E220	Beech B24R	5 Oct 74	0	S Wallkill, N.Y. USA. No. 3 conrod.
E325	Beech A24 Muskeeter	1979	0	S Marulan NSW, Australia. Piston pin (faulty manufacture).
E385	Beech A23-24	31 Mar 81	0	S Sawyer, Ky. USA. No. 4 cylinder wall.
F37	<u>Propeller</u> Beech A23 Muskeeter	6 Jul 66	0	S Boulder, Colo. USA. Propeller blade (improper blade).
F56	Beech A23 Muskeeter	8 Jul 67	0	S Aqua Dulce, Cal. USA. 19" of Sensenich propeller blade separated. AD not complied with.
F161	Beech A23A Muskeeter	1976	1	D Australia. Most of prop blade shed.
F184	Beech 23 Sundowner	25 Jun 77	0	S Matane, Que. Canada. Prop blade failed 9" from end (undressed dent on leading edge).
G96	<u>Landing Gear</u> Beech M-23 Muskeeter	10 Jan 65	0	S Lombard, Ill. USA. Right landing gear strut.
G149	Beech 23 Muskeeter	14 Dec 65	0	S Knoxville, Tenn. USA. Right gear at wing attach plate (improperly- fastened attach screws)
G154	Beech 23 Muskeeter	8 Jan 66	0	S Joliet, Ill. USA. Right main landing gear.
G254	Beech 23 Muskeeter	16 May 69	0	S Colts Neck, N.J. USA. Main landing gear.
G288	Beech 23 Muskeeter	24 Nov 70	0	S Davenport, Iowa. USA. Right main landing gear housing P/N 169-810011-21
G310	Beech A23 Muskeeter	3 Jul 71	0	S Joliet, Ill. USA. Right gear casting separated 2 1/2" below mounting thru bolt.
H14	<u>Miscellaneous</u> Beech A23 Muskeeter	5 Dec 67	0	S Chamblee, Ga. USA. Both brake castings fractured. Struck parked Cessna 172 (substantial damage).

BEECH QUEEN AIR

E160	<u>Engine</u> Beech 65-80 Queen Air	9 Dec 71	7	D Oklahoma City, Okla. USA Left engine no. 5 conrod cap.
E265	Beech 65 Queen Air	27 Jul 76	0	S Bedford, Ma. USA. Crankshaft (#3 counter wt hanger).

E287	Beech 65-80 Queen Air	13 Aug 77	3 D Vancleave, Miss. USA. Crankshaft (crack at #5 connecting rod throw).
G78	<u>Landing Gear</u> Beech 65-80 Queen Air	13 Sep 64	0 S Seward AFB, Tenn. USA. Nose gear chain sprocket attach bolt.
G355	Beech 65-80 Queen Air	8 Aug 73	0 S Chattanooga, Tenn. USA. Nose gear actuator assembly attach bolt. No evidence of bolt being changed.

BEECH 99 AIRLINER

F105	<u>Propeller</u> Beech 99A Airliner	24 Nov 71	0 S Greeley, Colo. USA. Right prop blade failed (improper machining in balance hole cavity).
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BEECH 200 SUPER KING AIR

A128	<u>Wing</u> Beech 200 Super King Air	22 Jan 80	0 S Zanesville, Oh. USA. Fatigue fracture of lower forward wing attach bolt, PN LWB 22-16-44. Stress corrosion where CD plating scored.
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BELLANCA 7ECA/7GCBC CITABRIA (See Champion Citabria)

BELLANCA 8GCBC SCOUT

G530	<u>Landing Gear</u> Bellanca 8GCBC Scout	31 May 81	0 S St Andre Avellin, Que. Canada. "U" bolt, left main gear.
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B37	<u>Tail</u> Bellanca 8	1981	0 S Archerfield, Qld. Australia. Two elevator ribs failed. Aircraft landed safely.
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BELLANCA 14-13 CRUISAIR

E36	<u>Engine</u> Bellanca 14-13	14 Jul 64	0 S North Creek, N.Y. USA. Crankshaft.
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G137	<u>Landing Gear</u> Bellanca 14-13	31 Oct 65	0 S Somerset, Pa. USA. Left landing gear retract strut.
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G172	Bellanca 14-13	7 May 66	0 S Tony, Wis. USA. Welded fitting in right gear screw shaft assembly. P/N 9837.
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G221	Bellanca 14-193	21 Oct 67	0 S Kenner, La. USA. Right upper strut of nose gear assembly.
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BELLANCA 14-19 CRUISEMASTER

E199	<u>Engine</u> Bellanca 14-19	7 Sep 73	0 S Hammondsport, N.Y. USA. No. 3 piston oil wiper ring, fractured at heel.
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BELLANCA 17-30

Engine
 E274 Bellanca 17-30A 24 Oct 76 2 D Nakina, N.C. USA.
 Muffler-assembly ball joint cracked in weld area, causing burned ignition leads & engine failure.

BOEING/STEARMAN 75 KAYDET (PT-13, PT-17)

Engine
 E39 Boeing 75N1 Stearman 19 Sep 64 0 S Lepanto, Ark. USA.
 Crankshaft, next to front thrust bearing.
 E44 Boeing PT-13 Stearman 15 Mar 65 0 S Legrand, Cal. USA.
 Crankshaft at thread area of thrust bearing nut
 E85 Boeing IB75A Stearman 23 Jul 66 1 D Valparaiso, Ind. USA.
 Crankshaft. Prop shaft separated at thrust nut threads, prop hit wing brace & wing folded.
 Role: aerobatics.
 E117 Boeing 75 Stearman 9 May 69 0 S Five Points, Cal. USA.
 Crankshaft broken in thrust nut thread area.

E129 Boeing A75 Stearman 13 Jun 70 0 S Sacramento, Cal. USA.
 No. 1 cylinder.

E20^c Stearman A75 29 Mar 74 0 S Pixley, Cal. USA.
 Crankshaft.

E281 Boeing A75-N1 Stearman 11 Jun 77 0 S Sulphur, La. USA.
 No. 2 link rod of piston.

Propeller

F27 Boeing A75-N1 Stearman 8 Mar 65 1 D Sherrill, Ark. USA.
 Propeller (blade retention mechanism)
 F31 Boeing A75 Stearman 9 Jul 65 0 S Homedale, Id. USA.
 Propeller blade (12" from tip).
 F42 Boeing A75 Stearman 14 Aug 66 0 D Dos Palos, Calif. USA.
 Propeller blade. Role: spraying.
 F44 Boeing A75 Stearman 2 Sep 66 0 S Gustine, Cal. USA.
 Blade in shank area (unapproved blades).
 F50 Boeing 75N1 Stearman 30 Mar 67 0 D McKittrick, Calif. USA.
 Propeller blade. Role crop control.
 F59 Boeing B75N1 Stearman 16 Oct 67 0 D Gilliam, La. USA.
 Propeller blade. Role crop seeding.
 F77 Boeing A75N1 Stearman 11 Jul 69 0 S West Point, Miss. USA.
 16" of blade separated.
 F78 Boeing 75 Stearman 16 Jul 69 0 S Hilmar, Cal. USA.
 Propeller.

F82	Boeing 75 Stearman	16 Aug 69	0	S Los Banos, Cal. USA. Blade broke 5" from butt end.	
F104	Boeing A75 Stearman	10 Nov 71	0	S Holtville, Cal. USA. Piece of propeller blade shed.	
F140	Boeing A75 Stearman	27 Sep 74	0	S Dos Palos, Cal. USA. Propeller blade (3" from butt end).	
F150	Boeing A75L3 Stearman	26 Jun 75	0	S Hickman, Cal. USA. Blade separated 5" from butt end.	
F176	Boeing A75 Stearman	18 Sep 76	1	D Parlier, Calif. USA. Propeller blade broke 5 in. from butt. Role: aerial application.	
<u>Landing Gear</u>					
G81	Boeing E75 Stearman	7 Oct 64	0	S Bakersfield, Cal. USA. Landing gear strut at upper sleeve.	
G259	Boeing E75 Stearman	5 Sep 69	0	S Orange, Tex. USA. Right gear.	
G489	Boeing PT-17	13 Sep 79	0	S Shreveport, La. USA. Left main gear.	
<u>Engine Mount</u>					
H8	Boeing E-75 Stearman	12 Jul 64	0	S Sherbrooke, Que. Canada. Engine attachment bolts.	
H9	Boeing E75N1 Stearman	13 Jul 64	0	S Mercedes, Tex. USA. Engine tearaway. Engine structure: mount and vibration isolators.	

BOEING B-17

<u>Wing</u>					
A119	Boeing B-17G	17 Aug 76	0	S Cordele, Ga. USA. Left front spar, lower cap centre section, P/N 753424-2 cracked. 1/2" outboard of inboard bolt of aft terminal plate, 8" inboard of inboard jack pad. Airframe hours: 5546. Role: spraying. Aircraft landed safely.	
<u>Landing Gear</u>					
G55	Boeing B-17G	27 Apr 64	0	S Marana, Ariz. USA. Left gear drag strut terminal fitting.	

BOEING B-47 STRATOJET

<u>Wing</u>					
A53	Boeing B-47 Stratojet (USAF)	1958	3?	D USA. Wing separation. Longeron failure. Role: Low Altitude Bombing System.	
A54	Boeing B-47 Stratojet (USAF)	1958	3?	D USA. Wing separation. Longeron failure. Role: Low Altitude Bombing System.	

AIRCRAFT TYPE (FIXED-WING)

A55 Boeing B-47 1958 3? D "SA.
Stratojet (USAF) Wing separation. Longeron failure. Role: Low Altitude Bombing System.

Fuselage
C2 Boeing B-47 1953-59 ? ? ?
Stratojet (USAF) Fuselage failure.

BOEING B-52 STRATOFORTRESS

Wing
A39 Boeing B-52 1953-59 ? ? ?
Stratofortress (USAF) Wing failure.

A40 Boeing B-52 1953-59 ? ? ?
Stratofortress (USAF) Wing failure.

A60 Boeing B-52 1961? ? D USA?
Wing failure.

Fuselage
C10 Boeing B-52 19 Jan 61 8? D Monticello, Utah USA.
Stratofortress (USAF) Aft fuselage just forward of vertical stabilizer. Role: low altitude

C11 Boeing B-52 24 Jan 63 8? D Little Shanty Mountain, Maine USA.
Stratofortress (USAF) Aft fuselage just forward of vertical stabilizer. Role: low altitude

C12 Boeing B-52 30 Jan 63 8? D Mora, New Mexico USA.
Stratofortress (USAF) Aft fuselage just forward of vertical stabilizer. Role: low altitude

BOEING 377 STRATOCRUISER

Propeller
F6 Boeing 377 29 Apr 52 50 D Carolina, Brazil.
Stratocruiser Propeller failure caused separation of no. 2 engine.

F9 Boeing 377 26 Mar 55 4 D Off Oregon coast, USA.
Stratocruiser No. 3 engine tore loose after propeller failure. Hamilton-Standard 2J17 propeller.

BOEING 707/720

Tail
B14 Boeing 707-436 5 Mar 66 124 D Mt. Fuji, Japan.
Vertical stabilizer separated. Gust load considerably in excess of design limit. Fatigue cracks in vertical stabilizer rear spar, starboard attachment fitting (bolt holes). 19,532 hours. Tests on similar fitting with cracks failed at 110% limit design load.

B28 Boeing 707 14 May 77 6 D Lusaka, Zambia.
321C Separation of right horizontal stabilizer & elevator. Stabilizer rear top chord. Airframe hours: 47,621.

	<u>Fuselage</u>				
C20	Boeing 707-349C	24 Sep 70	0	S	Enroute Shannon/London Loss of pressurization, fatigue of portion of external main cargo door skin.
	<u>Flight Controls</u>				
D20	Boeing 707	26 Jul 69	5	D	Pomona, N.J. USA. Hydraulic system, port outboard spoiler down-line. Loss of fluid in control system for rudder & rudder tab caused loss of directional control. Role: Training.
	<u>Engine</u>				
E26	Boeing 720	1 Feb 62	0	S	Portland, Ore. USA. Third stage compressor blades. Origin: trailing edge corner of dovetail on convex side of blade
E50	Boeing 720B	3 May 65	0	S	Los Angeles, Cal. USA. No. 2 engine 2nd stage fan disc. Spacer hole, P/N 421602.
E75	Boeing 720	13 Feb 66	0	S	Dallas, Tex. USA. Turbine spacer, wheel.
E102	Boeing 707-465	8 Apr 68	5	D	Heathrow Airport, London England. No. 5 low pressure compressor wheel.
E132	Boeing 707	22 Jun 70	0	S	London, UK. Disk diaphragm at runout of outboard radius of front integral spacer (8th stage HP compressor, no. 1 engine). Disk hours: 15,157.
E149	Boeing 707	21 Jul 71	0	S	Dallas, Tex. USA. No. 3 engine (P&W JT-3D), segment of no. 1 fan disk.
E186	Boeing 707	20 Jan 73	0	S	Elk Grove Village, Ill. USA. 3rd stage nozzle vane retaining lugs, no. 4 engine (fretting).
H26	<u>Engine Pylon</u>				
H26	Boeing 707-100	5 Apr 77	0	S	St. Louis, Mo. USA. No. 3 pylon mid-spar attachment fitting. Pylon and engine separated.
	<u>Landing Gear</u>				
G14	Boeing 707	12 Jul 59	0	S	New York, USA. 2 front wheels of left main gear separated. Origin: peen mark made by contact between truck beam & anti-rotation bolt.
G87	Boeing 720	5 Nov 64	0	S	San Francisco, Cal. USA. Nose gear drag brace lockrod upper attach bolt. P/N BACB30ABP 6-37.
G90	Boeing 707-123B	12 Nov 64	0	S	Nashville, Tenn. USA. Nos. 5-6 axle section near inner bearing brake collar. 16,000 hours on part.

AIRCRAFT TYPE (FIXED-WING)

G112 Boeing 707-120	11 May 65	0 S El Paso, Tex. USA. No. 7 wheel, axle failed at brake journal.
G343 Boeing 707-320	1973	0 S Sydney NSW, Australia. Left main gear trunnion support rib (inboard flange rear fastener hole). 16,933 landings.
G350 Boeing 707	9 Apr 73	0 S Miami, Fla. USA. Nose gear outer cylinder. Origin: pre-existing stress corrosion crack.
G394 Boeing 707	18 Feb 75	0 S Longview, Tex. USA. Nosewheel outer cylinder improperly machined.
G529 Boeing 707	11 May 81	0 S Kilgali/Kanombe Airport, Rwanda. Nose gear shaft. Stress-corrosion & fatigue crack. Origin: corrosion pit at bore of shaft.

BOEING 727

<u>Engine</u>		
E130 Boeing 727	16 Jun 70	0 S Boston, Mass. USA. Compressor disc, 11th stage. P/N 496911R.
<u>Landing Gear</u>		
E247 Boeing 727-200	17 Sep 75	0 S Tokyo, Japan. Welding parts (Ps4) of combustion chamber outer case. Origin: pitting corrosion.
G280 Boeing 727	28 Sep 70	0 S Las Mercedes Airport, Managua, Nicaragua. Rear support of actuating link, left-gear door.
G282 Boeing 727	4 Nov 70	0 S Savannah, Ga. USA. Right main landing gear aft trunnion support beam. P/N 65-16230-16.
G291 Boeing 727	16 Dec 70	0 S Burbank, Cal. USA. Left main landing gear trunnion beam at bearing hole.
G304 Boeing 727	26 Feb 71	0 S St. Louis, Mo. USA. Left gear trunnion support beam (attach hole).
G335 Boeing 727	1 Oct 72	0 S San Francisco, Cal. USA. Stress corrosion and fatigue, front trunnion bearing support fitting.
G392 Boeing 727-227	1975	0 S Sydney NSW, Australia. Port main gear (trunnion). Groove machined in during manufacture.
G404 Boeing 727	23 Aug 75	0 S Buffalo, N.Y. USA. Link assembly trunnion of left main gear.
G468 Boeing 727	7 Aug 79	0 S El Paso, Tex. USA. Down-lock rod, PN 69-33654-4.

G520 Boeing 727 31 Jan 81 0 S Flushing, N.Y. USA.
 Fatigue fracture of reworked trunnion link, P/N
 65-57904-18, at stress corrosion area.

BOEING 737

G487 Landing Gear Boeing 737-100 18 Aug 79 0 S Dillingham, Ak. USA.
 Port lower drag strut bolt, PN 69-39473-2.
 Intergranular corrosion from worn chrome
 plating. Corrosion and fatigue fracture.

BOEING 747

D26 Flaps Boeing 747-136 16 May 75 0 ? Prestwick, Scotland.
 Right inboard wing trailing edge foreflap
 detached. Crack in outboard sequence carriage
 attachment fitting at horiz flange. 13,732
 airframe hours, 5507 landings.

D36 Boeing 747SR-100 11 Nov 78 0 S Osaka, Japan.
 Flap track bolts of right outer trailing edge
 flap.

E156 Engine Boeing 747 8 Nov 71 0 S Jamaica, N.Y. USA.
 No. 1 engine diffuser case near the no. 5
 boroscope boss.

G413 Landing Gear Boeing 747 8 Nov 75 0 S Bombay, India.
 Inner hub, no. 8 main wheel.

H34 Engine Pylon Boeing 747-121 27 Dec 79 0 S Heathrow Airport, London England.
 Pylon forward bulkhead of #4 engine. 2.5 inch
 crack on Inconel horse collar chord. 34,615
 hours. Forward bulkhead pulled out of pylon.
 Initiated maybe from prior collision with
 baggage container.

BOLKOW 208

G313 Landing Gear Bolkow 208 29 Aug 71 0 S Rotorua Airport, New Zealand.
 Nose leg outer tube.

BOWERS FLY BABY

A99 Wing Bowers Fly Baby 1-A 20 May 71 0 D Oxford, Conn. USA.
 Left wing failure. Flying-wire turnbuckle
 failed. Pilot parachuted.

BRISTOL BRITANNIA

G25 Landing Gear Bristol Britannia 11 Nov 60 0 S Khartoum, Sudan.
 Support member for starboard main gear uplock.

BRISTOL 170 WAYFARER/FREIGHTER

	<u>Wing</u>			
A43	Bristol 170	25 Nov 53	2	D Mallala, South Australia. Wing failure in high-load high-speed manoeuvre.
	<u>Freighter</u>			Fatigue crack reduced strength below design strength, but not necessarily below limit strength. Lower surface of torsion box on joint between rear lower skin angle and inter-span skin.
A47	Bristol 170	5 Feb 55	13	D Lagos, Nigeria. Left wing failure, doubler plate of spar.
A51	Bristol 170	21 Nov 57	4	D Christchurch, New Zealand. Wing failure. Lower boom of starboard outer wing, front spar joint at last bolt hole. Matl: DTD 364 (equiv 24ST). Airframe hours: 7900.

BRITISH AEROSPACE BUCCANEER

	<u>Wing</u>			
A125	British Aerospace Buccaneer (RAF)	12 Jul 79	2	D Osnabruck, W. Germany. Wing separated. Main spar latch pin, wing-fold joint.
A130	British Aerospace Buccaneer S.2B (RAF)	7 Feb 80	2	D Nellis AFB, Nevada, USA. Right wing failure. Mainplane inner-front spar.

BRITTEN-NORMAN ISLANDER

	<u>Landing Gear</u>			
G494	Britten-Norman BN-2A Islander	6 Feb 80	0	S Mont Joli, Que. Canada. Left oleo scissor link pin bolt. Exceeded 50-hour inspection.
G542	Britten-Norman BN-2A Islander	20 Sep 82	0	S Sable Island, N.S. Canada. Bulkhead to which nosegear was attached.

BRITTEN-NORMAN TRISLANDER

	<u>Propeller</u>			
P179	Britten-Norman BN2A-8 Trislander	14 Jan 77	0	S St. Thomas, Virgin Islands. Propeller blade.

BUCKER JUNG BU-131

	<u>Engine</u>			
E399	Bucker Jung 1.131	3 Oct 81	2	D Baltimore, Md. USA. Crankshaft. Rear cone of prop hub not installed.
F220	Propeller Bucker Jung BU-131	4 May 80	0	S Colwich, Ks. USA. Fatigue fracture of prop, EN4 ST-21. Corrosion discoloration present.

BUSHBY/LONG MIDGET MUSTANG

F207 Propeller **Midget** **Mustang** **27 Dec 78** **O S** **Prescott, Ariz. USA.**
13" of # 1 blade shed. Dent in leading edge.

C.A.C. CA-28 CERES (See Commonwealth CA-28 Ceres)

CALLAIR A-5

CALLAIR A-9

D14 Flight Controls CallAir A-9 16 Aug 67 1 D Knobel, Arkansas USA.
Fracture of right rudder cable, which was chafing against off-centre fairlead. Role: aerial application.

Engine

E94 CallAir A-9 8 Jun 67 0 D Belvidere, S. Dakota USA.
Outlet connector at fuel selector failed.
Role: Crop spraying.

E113 Aero 8 Mar 69 O S Selma, Cal. USA.
Commander A-9B Crankshaft at no. 5 crankpin.

E146 Aero 16 Apr 71 O D Purvis, Miss. USA.
Commander A-9B No. 5 conrod. Role: Spraying.

E157 Aero 10 Nov 71 0 S Elmira, Cal. USA.
Commander Forward fillet of # 3 main journal of crank-
A-9B shaft, P/N 45075-77.

E188 Aero 19 Feb 73 0 S Sunnymead, Cal. USA.
Commander A-9B Crankshaft.

E206 CallAir A-9B 14 Mar 74 0 S Calexico, Cal. USA.
No. 5 connecting rod.

Propeller
F139 CallAir A-9 5 Sep 74 O D Amarillo, Texas USA.
Propeller blade. Role: crop spraying.

CANADAIR CL-41 TUTOR

B31 Tail
Canadair 3 May 78 1 D Grande Prairie, Alta. Canada.
CL-41 Tutor Horizontal stabilizer separated. Crack at corner
(Canadian in stabilizer rear attachment fitting. Snowbird
Forces) aerobatic team. Material: 7075-T6

CANADAIR CL-44

G89 Landing Gear Canadair CL-44 12 Nov 64 0 S Detroit, Mich. USA.
Left main gear uplock actuator cylinder, P/N 28-75001.

AIRCRAFT TYPE (FIXED-WING)

G277 Canadair 30 Apr 70 0 S New York, N.Y. USA.
 CL-44J Mounting lug of left main gear actuating mounting bracket (at bolt hole). 14,120 hours.

G387 Canadair 22 Dec 74 0 S Lusaka, Zambia.
 CL-44 Nose gear radius rod.

CANADAIR CL-84

Gearbox
 E196 Canadair 8 Aug 73 0 D Patuxtent, Md. USA.
 CL-84 Dynavert Gear broke in prop gearbox. 123 hours on part.

CENTRE EST (See Robin)CESSNA T-50 CRANE

Engine
 E16 Cessna T-50 4 Apr 59 0 S Kasigluk, Alaska, USA.
 Crankshaft, next to rear side of propeller thrust nut.

CESSNA 120

Engine
 E167 Cessna 120 19 Apr 72 0 S Watervliet, Mich. USA.
 Carburetor butterfly valve.

Propeller
 F107 Cessna 120 13 Feb 72 0 S Beaumont, Kans. USA.
 Propeller blade.

Landing Gear
 G219 Cessna 120 6 Sep 67 0 S Pekin, Ill. USA.
 Left gear at bolt hole holding step

G272 Cessna 120 2 Mar 70 0 S Gaithersburg, Md. USA.
 Right landing gear support bracket.

G284 Cessna 120 8 Nov 70 0 S Lowell, Mich. USA.
 Right axle.

CESSNA 140

Wing
 A48 Cessna 140 1956 ? D USA.
 Wing failure. Lift strut fitting.

Engine
 E47 Cessna 140 14 Apr 65 0 S Tulsa, Okla. USA.
 No. 2 cylinder.

E87 Cessna 140A 25 Aug 66 0 S Sikes, La. USA.
 No. 3 cylinder exhaust valve.

Landing Gear
 G45 Cessna 140 9 Feb 64 0 D Gainesville, Florida USA.
 Fracture at step plate bolt hole of main gear.

G77 Cessna 140 11 Sep 64 0 S Chicago, Ill. USA.
 Right gear strut at wedges.

G83 Cessna 140 20 Oct 64 0 S Horn Lake, Miss. USA.
 Main gear (strut saddle showed old crack).

G99 Cessna 140	24 Jan 65	0	S Fort Lauderdale, Fla. USA. Left main gear axle.
G211 Cessna 140	30 May 67	0	S North Kingstown, R.I. USA. Left landing gear.
G215 Cessna 140A	1 Jul 67	0	S North Canton, Ohio. USA. Landing gear (bolt hole at step attach point).
G261 Cessna 140	24 Oct 69	0	S Flint, Mich. USA. Right gear at step assembly attach point
G263 Cessna 140	17 Dec 69	0	S Sand Springs, Okla. USA. Left wheel fell off (broken axle).
G423 Cessna 140	10 Feb 76	0	S Vankleek Hill, Ont. Canada. Left ski axle.
G504 Cessna 140A	30 Apr 80	0	S Atlanta, Ga. USA. Right main landing gear spring, P/N 0441149-1.
G539 Cessna 140	19 Nov 81	0	S Barrett Lake, Ca. USA. Right main gear strut P/N 044-1149-1 at step attach upper bolt hole.
G541 Cessna 140 (on skis)	22 Jan 82	0	S Kajaani, Finland. Left landing gear.

CESSNA 150

Tail

B11 Cessna 150	4 Nov 62	0	D Prince Albert, Sask. Canada. Bottom flange of rudder spar. Origin: bend radius of flange. Role: aerobatics.
B16 Cessna 150	12 Dec 68	0	S North Iliamna, Alas. USA. Rudder at vertical spar.

B33 Cessna 150	9 Oct 78	0	S Hamilton, Ont. Canada. Horizontal stabilizer, attachments. 5901 airframe hours.
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Engine

E72 Cessna 150F	22 Jan 66	0	S West Los Angeles, Cal. USA. No. 1 connecting rod.
E101 Cessna 150F	7 Mar 68	0	S Findo-Gask, Perthshire, UK. Engine cylinder.
E110 Cessna 150G	1969	0	S King Is Ad, Tas. Australia. Exhaust valve rocker arm.
E134 Cessna 150	13 Jul 70	0	S Deer Park, N.Y. USA. Crankshaft broke at no. 4 web above journal.
E213 Cessna 150	31 Jul 74	0	S Cobble Hill, BC, Canada. No. 1 cylinder exhaust valve.

AIRCRAFT TYPE (FIXED-WING)

E242 Cessna 150F 16 Aug 75 0 S Jean, Nev. USA.
Mixture control wire came loose at carburetor.

E271 Reims Avion F-150L 7 Sep 76 0 S Tuensdorf, West Germany.
Connecting-rod bearing damaged as a result of loss of oil through a broken dump valve.

E319 Cessna 150L 17 Sep 78 0 S Strathlorne, N.S. Canada.
Continental O-200 engine. #4 connecting rod cap (outer corners of oil scavenge hole).

E329 Cessna 150 27 Feb 79 0 S Anchorage, Alas. USA.
Head of # 3 cylinder.

E335 Cessna 150 27 May 79 0 S Turku, Finland.
Engine cylinder.

E366 Cessna 150 5 Sep 80 0 S Wellandport, Ont. Canada.
Continental O-200 engine. No. 3 cylinder rocker shaft support.

E380 Cessna 150M 18 Feb 81 0 S Eudora, Ks. USA.
No. 4 cylinder at 5th cooling fin from mounting flange.

E390 Cessna 150 5 Jul 81 0 S Georgetown, Ca. USA.
Mixture control bracket (outside the weld on exhaust cross-over brace).

E401 Cessna A150L 11 Oct 81 1 D Oak Ridge, Tn. USA.
No. 4 cylinder, P/N 50222, under chrome plating.

Propeller

F55 Cessna 150 29 Jun 67 0 S Naperville, Ill. USA.
6" of tip of blade separated (stone damage).

F75 Cessna 150F 23 Oct 68 0 S Bedford, Mass. USA.
4" missing from tip of blade.

F81 Cessna 150F 11 Aug 69 0 S Louisville, Miss. USA.
Spinner bulkhead.

F135 Cessna 150 28 Jul 74 0 S Erin, Ont. Canada.
Propeller.

F212 Cessna 150 6 Jul 79 0 S Milwaukee, Wis. USA.
Propeller missing 5" of blade tip. McCauley model 1A100/MCM.

F216 Cessna 150 1980 0 S Wiluna, WA, Australia.
14 cm of prop blade shed (stone damage).

F218 Cessna 150 Super 23 Feb 80 0 S Joensuu Airport, Finland.
Propeller blade.

<u>Landing Gear</u>						
G30	Cessna 150	2 Jun 61	0	S	Vancouver, B.C. Canada. Left gear leg (steel) 8 inches from fuselage attachment. Fretting.	
G58	Cessna 150A	2 May 64	0	S	Boca Raton, Fla. USA. Nose gear fork.	
G92	Cessna 150	22 Nov 64	0	S	Agawam, Mass. USA. Left gear spring assembly.	
G117	Cessna 150	6 Jul 65	0	S	Whitehouse, N.J. USA. Nose gear fork.	
G134	Cessna 150	16 Oct 65	0	S	West Chester, Pa. USA. Left gear spring assembly.	
G148	Cessna 150E	14 Dec 65	0	S	Ronkonkoma, N.Y. USA. Nose gear steering tube assembly rod end bearing.	
G157	Cessna 150	17 Feb 66	0	S	Hot Springs, Ark. USA. Nose gear mounting bracket.	
G202	Cessna 150	19 Mar 67	0	S	Blytheville, Ark. USA. Left trunnion bolt.	
G233	Cessna 150	14 May 68	0	S	Jacksonville, Ark. USA. 2 broken diagonal members holding upper nose gear retaining collar in place.	
G234	Cessna 150	15 May 68	0	D	Montgomery, Ala. USA. Nosewheel landing gear, cracks on left & right side of nose wheel fork.	
G248	Cessna 150E	10 Feb 69	0	S	Johnson, Kans. USA. Landing gear, nosewheel assemblies. Commonly used on rough strips.	
G258	Cessna 150	23 Aug 69	0	S	San Bernardino, Cal. USA. Landing gear (nosewheel assemblies).	
G273	Cessna 150G	23 Mar 70	0	S	Archer, Fla. USA. Nosewheel strut support tubes.	
G360	Cessna 150E	27 Sep 73	0	S	Kirchheim-Teck, W. Germany. Main landing gear strut attachment (sharp notch).	
G515	Cessna 150	27 Nov 80	0	S	Alma, Que. Canada. Nosewheel fork collar (bolt holes). 5000 hours since new.	

CESSNA 170 (L-19)

SECTION IV (E-19)					
<u>Flight Controls</u>					
D7	Cessna 170	4 Oct 64	0	S Effingham, Ill. USA. Left rudder cable.	
E53	<u>Engine</u> Cessna TL-19D	15 Jun 65	0	S Almyra, Ark. USA. Fuel mixture control arm.	
E65	Cessna 170B	13 Oct 65	0	S Silverdale, Wash. USA. Valve assemblies, fatigue fracture. Exhaust valve burned, spark plugs excessively worn.	
E128	Cessna 170A	6 Jun 70	0	S Greenfield, Ind. USA. No. 4 connecting rod.	
G27	<u>Landing Gear</u> Cessna 170A	9 Jan 61	0	S St. Francois de Montmagny, Que. Canada. Right gear leg (2 top axle attachment holes). Spring steel.	
G48	Cessna 170	1 Mar 64	0	S Oklahoma City, Okla. USA. Gear collapsed.	
G86	Cessna 170	25 Oct 64	0	S Marshland, Neb. USA. Landing gear. Fatigue nucleus at radius - improper machining.	
G193	Cessna 170B	13 Oct 66	0	S Shelby, Miss. USA. Right main wheel axle separated at radius of axle to flange mount.	
G216	Cessna 170	22 Jul 67	0	S Miltonvale, Kans. USA. Left landing gear axle.	
G305	Cessna 170A	4 Mar 71	0	S LeClaire, Iowa. USA. Right wheel axle.	
G329	Cessna 170	17 Jul 72	0	S Chugiak, Alas. USA. Landing gear.	
G399	Cessna 170	14 Jun 75	0	S Calgary, Alta. Canada. Left wheel axle.	
G451	Cessna 170A	30 Oct 77	0	S Bielefeld-Wdb1., W. Germany. Axle of left main landing gear wheel.	
G513	Cessna 170	4 Oct 80	0	S Wright, Wy. USA. Right landing gear axle.	
G533	Cessna 170	3 Aug 81	0	S Middle Lake, Sask. Canada. Left axle. Machining marks in axle-flange fillet.	

CESSNA 172 SKYHAWK

Flight Controls
D11 Cessna 172G 26 Dec 65 0 S Streator, Ill. USA.
Left aileron push-pull rod.

D21	Cessna 172	17 Jan 71	0	S Claypool, Ind. USA. Right aileron push-pull rod assembly P/N 053218-2 broken.
D31	Cessna 172	3 Jun 77	0	S Basking Ridge, N.J. USA. Flap switch, down to neutral position spring broken.
E83	<u>Engine</u> Cessna 172	3 Jul 66	0	S Huntsville, Ont. Canada. No. 1 cylinder barrel between 6th and 7th cooling fins.
E151	Cessna 172C	7 Aug 71	0	S Elmo, Pa. USA. Engine mixture control wire (2 in. from control arm attach point).
E179	Cessna 172B	11 Nov 72	0	S Marton, New Zealand. No. 5 cylinder at base, in region of nos. 1 & 3 cooling fins.
E218	Reims Avion F 172H	15 Sep 74	0	D Letmathe-Loessel, W. Germany. Connecting rod.
E231	Cessna 172L	3 Jun 75	0	S Mt. Sterling, Ill. USA. Stepped dowel pin P/N STD-1065.
E286	Cessna 172	11 Aug 77	0	S Pelican Lake, B.C. Canada. Fractured oil line. Continental O-300 engine.
E304	Cessna 172A	4 Jun 78	0	S Trail, B.C. Canada. Continental C-145 engine. # 2 cylinder 1" below top of barrel. Origin: surface laps & seams due to rough machining.
E305	Cessna 172	9 Jun 78	0	S La Conception, Que. Canada. Avco Lycoming O-320 engine. #3 exhaust valve assembly.
E330	Cessna 172	15 Mar 79	0	S Cedar Key Airport, Fla. USA. Continental O-300 engine. # 3 cylinder barrel. Origin: Corrosion pits on outer surface of barrel between cowling fins.
E340	Cessna 172K	30 Aug 79	0	S Hopewell, Va. USA. Crankshaft.
E349	Cessna 172	6 Feb 80	0	S Bruce, Wi. USA. Oil pump drive gear shaft, P/N 634010.
E403	Cessna 172K	27 Dec 81	0	D Laguna Beach, Ca. USA. Mixture control wire failed (constant bending). Clamp bolt would not rotate.
P89	<u>Propeller</u> Cessna 172K	8 Aug 70	0	S Homer, La. USA. Approx. 6" prop tip missing (blade nick).

I-30
AIRCRAFT TYPE (FIXED-WING)

F94	Cessna 172	1 May 71	0	S Beaver Falls, Pa. USA. Prop blade near tip.
F115	Cessna 172	29 Sep 72	0	S Clinton, Mich. USA. Propeller blade.
F121	Cessna 172K	6 Apr 73	0	S Oceanside, Cal. USA. Propeller blade (8" from tip).
F203	Cessna 172L	6 Aug 78	0	S Skwentna, Ak. USA. Propeller blade.
F228	Cessna 172P	1 Jul 81	0	S Thief River Falls, Mn. USA. McCauley Model 1C160/DTM propeller, failed 12" from hub centre line (trailing edge nick).
G61	<u>Landing Gear</u> Cessna 172	22 May 64	0	S Alachua, Fla. USA. Nose wheel fork, P/N SK182-17.
G100	Cessna 172	25 Jan 65	0	S Kansas City, Mo. USA. Nose wheel fork.
G106	Cessna 172A	13 Mar 65	0	S Jacksonville, Ill. USA. Nose gear fork.
G107	Cessna 172	26 Mar 65	0	S San Antonio, Tex. USA. Nose wheel fork.
G142	Cessna 172	13 Nov 65	0	S College Park, Md. USA. Nose gear attach fitting.
G147	Cessna 172	11 Dec 65	0	S Gaithersburg, Md. USA. Nose gear fork.
G175	Cessna 172	21 Jun 66	0	S High Point, N.C. USA. Nose wheel fork. P/N SK 182-34.
G220	Cessna 172	14 Oct 67	0	S Salem, Ind. USA. Nose wheel fork.
G278	Cessna 172	28 Jun 70	0	S Lodi, Cal. USA. Nose wheel fork at sides of strut attach point.
G371	Cessna F172	4 Apr 74	0	S Iisalmi, Finland. Torque link bolt of ski nose landing gear.
G380	Cessna 172E	25 Jul 74	0	S Fremont, Neb. USA. Nose gear scissors assembly.
G386	Cessna 172	2 Nov 74	0	S Richland, Wash. USA. Left gear 14" above axle, at spot weld at pilot's assist step.
G422	Cessna 172	7 Feb 76	0	S Gananoque, Ont. Canada. Left main gear leg.

G429 Cessna 172	31 May 76	0 S	Deerfield Beach, Fla. USA. Main landing gear, P/N S2138-1.
G532 Cessna 172N	30 Jul 81	0 S	Glenville, W.V. USA. Main landing gear attachment bolt, PN S2138-1.

CESSNA 175 SKYLARK

<u>Engine</u>			
E42 Cessna 175	6 Feb 65	0 S	Brawley, Cal. USA. Crankshaft.
<u>Landing Gear</u>			
G80 Cessna 175	24 Sep 64	0 S	Blackfoot, Id. USA. Nose wheel fork cracked by previous damage.
<u> </u>			
G88 Cessna 175	8 Nov 64	0 S	Wilmington, Ohio. USA. Landing gear spring leaf broke (improper weld).
<u> </u>			
G227 Cessna 175	15 Jan 68	0 S	Williams Lake, B.C. Canada. Nose wheel fork at fork attachment bolt lug fillets (wheel shimmy).

CESSNA 177 CARDINAL

<u>Engine</u>			
E122 Cessna 177	1970	0 S	Randalls Bay, Tas., Australia. Oil line failed due not modified type.
<u>Propeller</u>			
F154 Cessna 177 Cardinal	29 Aug 82	0 S	Midnapore, Alta. Canada. Gearing failure in oil pump.
<u> </u>			
F155 Cessna 177B	18 Jul 75	0 D	Cambridge Narrows, N.B. Canada. Several inches of prop shed (nick).
<u> </u>			
F202 Cessna 177	20 Jul 75	0 S	Aledo, Ill. USA. Propeller at file marks repairing previous damage.
<u>Landing Gear</u>			
G460 Cessna 177	2 Aug 78	0 S	Eagle River, Wis. USA. Propeller blade (gouge 8" from tip).
<u> </u>			
<u> </u>			
12 Apr 78	0 S	Hartford, Conn. USA. Left main gear bolt P/N AN176H24A.	

CESSNA 180 SKYWAGON

<u>Wing</u>			
A58 Cessna 180	1 Mar 60	1 D	Mendip Hills, New Zealand. Wing failure. Starboard rear spar (root end). Crack probably initiated in ground-loop 3 months previously. Role: agricultural fertilizing. Airframe hours: 1813.
<u> </u>			
<u>Engine</u>			
E62 Cessna 180B	27 Sep 65	1 D	Lake Corneau, Que. Canada. No. 2 piston.

AIRCRAFT TYPE (FIXED-WING)

E291	Cessna 180 Skywagon	28 Aug 77	0	S High Level, Alta. Canada. Camshaft gear teeth (rough machining).
E383	Cessna 180	14 Mar 81	0	S Shishmaref, Ak. USA. No. 5 cylinder, PN 625859, failed in threaded area near cylinder head.
E391	Cessna 180 Skywagon	11 Jul 81	0	D Lake Margane, Que. Canada. Crankshaft. Subsurface initiation.
<u>Propeller</u>				
F11	Cessna 180	22 Nov 61	1	D Mangakino, New Zealand. Propeller blade separated. Crack on inside of clamp of propeller blade. Role: fertilizing.
F24	Cessna 180	3 Jan 65	0	S Burns, Ore. USA. Propeller blade (threads).
F40	Cessna 180	24 Jul 66	0	S Athabasca, Alta. Canada. 5 1/2 inches of no. 1 blade shed (nick).
F87	Cessna 180G	1970	0	S Parkes, NSW, Australia. 9 in. of prop blade shed (nick).
F88	Cessna 180	29 Jun 70	0	S Bumpy Lake, Ont. Canada. Propeller.
F144	Cessna 180	25 Apr 75	0	S Jackson, Wy. USA. Propeller blade (at tip). Blade shortened 1". File marks on blade.
F214	Cessna 180 Skywagon	19 Aug 79	0	S Atlin Lake, B.C. Canada. Blade broke at hub attachment (threads). McCauley constant speed prop.
<u>Landing Gear</u>				
G12	Cessna 180 (on skis)	24 Apr 59	0	S Martin Lake, Sask. Canada. Right gear leg at bolt holes. (Spring steel).
G13	Cessna 180 (wheel-ski)	13 May 59	0	S Point Barrow, Alaska USA. Starboard landing gear strut at bolt holes at wheel attachment end.
G15	Cessna 180	31 Aug 59	0	S Athabasca, Alta. Canada. Right gear leg at two top bolt holes.
G17	Cessna 180 (on skis)	9 Dec 59	0	S Beaverhill Lake, Man. Canada. Right gear leg at top two bolt holes where ski axle is attached.
G26	Cessna 180	24 Nov 60	0	S Wheatcroft Lake, Man. Canada. Left gear leg (upper two bolt holes).
G33	Cessna 180	8 Dec 61	0	S Red Lake, Ont. Canada. Right gear leg (2 upper bolt holes).

G47 Cessna 180	24 Feb 64	0	S Red Bay, Lab. Canada. Left spring leg at upper bolt holes.
G71 Cessna 180	29 Aug 64	0	S Aberdeen, Md. USA. Right gear attach bolt, P/N AN 7 20A.
G110 Cessna 180	7 May 65	0	S Tuktoyaktuk, NWT. Canada. Left spring leg at upper axle attachment holes.
G146 Cessna 180	29 Nov 65	0	S Fort McMurray, Alta. Canada. Right leg (top front bolt hole).
G155 Cessna 180	14 Jan 66	0	S Reno, Nev. USA. Tail wheel steering mechanism.
G167 Cessna 180B	21 Apr 66	0	S Whitehorse, Y.T. Canada. Right gear leg (top axle attachment holes).
G176 Cessna 180	23 Jun 66	0	S Prince George, B.C. Canada. Right wheel brake disc retaining clips.
G181 Cessna 180A	3 Aug 66	0	S Moberly Lake, B.C. Canada. Right gear leg immediately above axle upper attachment bolt holes. (Fretting).
G187 Cessna 180	6 Sep 66	0	S Tarentum, Pa. USA. Left gear attach bolt.
G206 Cessna 180	16 Apr 67	0	S Monticello, Ut. USA. Tail wheel spring.
G207 Cessna 180F (ski-wheel)	17 Apr 67	0	S Twin Falls, Labrador. Canada. Right gear leg at upper forward wheel attachment bolt hole.
G228 Cessna 180	25 Feb 68	0	S Peace River Airport, Alta. Canada. Tail wheel torque tube at forward bolt holes inside the servo casting.
G270 Cessna 180 (skis)	9 Feb 70	0	S Bathurst Inlet, NWT. Canada. Left gear leg at wheel axle upper attachment bolt hole.
G276 Cessna 180A (ski/wheels)	23 Apr 70	0	S Inuvik, NWT. Canada. Right gear leg at axle attachment upper bolt holes.
G285 Cessna 180	11 Nov 70	0	S Nantucket, Mass. USA. Left wheel attach bolts.
G327 Cessna 180	10 Jun 72	0	S Menomonee Falls, Wis. USA. Main gear (fretting).
G365 Cessna 180A	1974	0	S Boulia, Qld, Australia. Right spring leg.

AIRCRAFT TYPE (FIXED-WING)

G389 Cessna 180H	1975	0	S Jindabyne, NSW, Australia. Right gear leg.
G395 Cessna 180	1 Mar 75	0	S Lake Elmo, Mn. USA. Fatigue fracture. Rust corrosion break in right main gear leg.
G403 Cessna 180	6 Aug 75	0	S Wheatland, Wy. USA. Spring landing gear (outside retainer wedge). P/N 0741001-1.
G428 Cessna 180 Skywagon	17 May 76	0	S Red Lake, Ont. Canada. Main gear leg.
G432 Cessna 180	20 Jun 76	0	S Gelnhausen, W. Germany. Main landing gear strut attachment.
G441 Cessna 180G	1977	0	S Boorowa, NSW, Australia. Left main gear spring leg.
G462 Cessna 180 Skywagon	10 Jun 78	0	S Grand Centre, Alta. Canada. Right undercarriage leg near attachment holes.
G465 Cessna 180 Skywagon	23 Jun 78	0	S Manning, Alta. Canada. Left gear at upper forward axle attaching bolt hole. 4427 airframe hours.
G480 Cessna 180J (skis)	11 Mar 79	0	S Charlottetown, Lab., Canada. 2 bolts attaching right ski axle. Other 2 bolts had been missing for some time.
G484 Cessna 180 Skywagon	9 Jun 79	0	S Arthur North, Ont. Canada. Right main gear leg at fuselage. Para-drop operations, 15,000 landings.
G497 Cessna 180 Skywagon (skis)	4 Mar 80	0	S Cawdron Lake, Ont. Canada. Left main gear spring leg close to fuselage. Initiated by fretting and galling in soft decarburized surface zone.
G537 Cessna 180	27 Sep 81	0	S Corcoran, Mn. USA. Spring arm P/N 0741001-2 at upper 2 axle attach bolt holes.
H12 <u>Miscellaneous</u> Cessna 180	3 Sep 65	0	S Tarentum, Pa. USA. Left brake.

CESSNA 182

<u>Engine</u>			
E33 Cessna 182	6 Mar 64	0	D Sedalia, Mo. USA. Master & connecting rods.
E37 Cessna 182A	25 Jul 64	2	D Juneau, Alaska USA. Master & connecting rods

E68	Cessna 182B	29 Nov 65	0	S Mokelumne Park, Cal. USA. Crankshaft gear, P/N 536421.
E70	Cessna 182	10 Dec 65	0	S Hot Springs, Ark. USA. No. 6 cylinder exhaust valve.
E238	Cessna 182B	30 Jun 75	0	S Wachenheim, West Germany. Crankshaft.
E300	Cessna 182M	1978	0	S Wangaratta Vict., Australia. No. 5 piston disintegrated.
E317	Cessna 182Q	7 Sep 78	0	S San Antonio, Tex. USA. Carb heat control cable improperly rigged, bent, failed.
E351	Cessna 182	16 Feb 80	0	S Wandering River, Alta. Canada. Rocker arm support boss (overtorqued locking bolt).
<u>Propeller</u>				
F142	Cessna 182	28 Nov 74	0	S Lewiston, Id. USA. Propeller separated.
F171	Cessna 182	27 May 76	0	S Vallejo, Cal. USA. Propeller blade (last thread in hub).
F177	Cessna 182M	24 Nov 76	0	S Grain Valley, Mo. USA. Prop blade separated from hub (threaded area). Engine dampers out of tolerance.
F187	Cessna 182	18 Sep 77	0	S Granite City, Ill. USA. Two 5th order dampers on crankshaft caused imbalance. Propeller separated.
F204	Cessna 182C	10 Sep 78	0	S Hudson, N.Y. USA. Propeller blade actuating link P/N A1935 elongated, failed in fatigue.
<u>Landing Gear</u>				
G46	Cessna 182	22 Feb 64	0	S Napa, Cal. USA. Nose wheel fork.
G53	Cessna 182	4 Apr 64	0	S Washington, D.C. USA. Nosewheel shimmy damper support bracket.
G59	Cessna 182	9 May 64	0	S Northbrook, Ill. USA. Nose gear fork at radius of milled section at attach bolt.
G72	Cessna 182	30 Aug 64	0	S Flagstaff, Ariz. USA. Nose wheel fork.
G82	Cessna 182	18 Oct 64	0	S Cincinnati, Ohio. USA. Old crack in failed area of nose wheel fork.
G93	Cessna 182	7 Dec 64	0	S Fayetteville, N.C. USA. Nose wheel fork.

AIRCRAFT TYPE (FIXED-WING)

G103 Cessna 182G	17 Feb 65	0 S Syracuse, N.Y. USA. Nose gear torque link.
G109 Cessna 182	22 Apr 65	0 S Butte, Mont. USA. Nose wheel fork.
G113 Cessna 182B	13 May 65	0 S Northbrook, Ill. USA. Nose wheel fork.
G115 Cessna 182	22 Jun 65	0 S Slocum, R.I. USA. Nose gear fork.
G120 Cessna 182E	15 Jul 65	0 S Kansas City, Mo. USA. Nose gear fork.
G124 Cessna 182A	23 Aug 65	0 S Dravosburg, Pa. USA. Nose gear fork.
G144 Cessna 182	23 Nov 65	0 S Rolette, N.D. USA. Nose gear fork casting.
G151 Cessna 182	19 Dec 65	0 S Pontiac, Mich. USA. Nose gear fork.
G177 Cessna 182C	2 Jul 66	0 S Hyannis, Mass. USA. Nose wheel fork.
G186 Cessna 182A	3 Sep 66	0 S Pottstown, Pa. USA. Nose gear shimmy dampener arm and nose wheel fork failed.
G191 Cessna 182A	28 Sep 66	0 S Cairo, Ga. USA. Nose wheel shimmy dampener (at bracket).
G192 Cessna 182E	10 Oct 66	0 S Nashville, Tenn. USA. Nose wheel fork at strut attachment.
G197 Cessna 182E	18 Jan 67	0 S Vichy, Mo. USA. Nose wheel shimmy caused fork failure in areas weakened by previous damage.
G198 Cessna 182	31 Jan 67	0 S Helena, Mont. USA. Nosewheel fork.
G208 Cessna 182	23 Apr 67	0 S Millville, N.J. USA. Nose wheel fork.
G214 Cessna 182E	29 Jun 67	0 S Teterboro, N.J. USA. Landing gear: nosewheel assemblies.
G225 Cessna 182A	29 Nov 67	0 S El Paso, Tex. USA. Nose wheel fork.
G226 Cessna 182	12 Dec 67	0 S Jefferson, Ga. USA. Nose wheel shimmy dampener attach bracket.

G239 Cessna 182A	29 Sep 68	0 S	Mill Creek, Okla. USA. Nose gear fork had cracks at strut attach bolt.
G326 Cessna 182F	31 May 72	0 S	Logansport, Ind. USA. Left gear strut. Origin: fretting corrosion.
G388 Cessna 182E	1975	0 S	Timboon, Vic., Australia. Fork of nose gear.
G454 Cessna 182E	1978	0 S	Beverley, WA, Australia. Right strut, corrosion fatigue.
<u>Miscellaneous</u>			
H18 Cessna 182	30 Aug 70	0 S	Carey, Id. USA. Right brake line broken adjacent to step.
H31 Cessna 182M	1978	0 S	Bunbury WA, Australia. Broken brake cable.

CESSNA 185

<u>Engine</u>			
E77 Cessna 185C	26 Feb 66	0 S	Morgan City, La. USA. Crankshaft at propeller mounting flange.
E259 Cessna 185 Skywagon	29 Apr 76	0 S	Whonnock Lake, B.C. Canada. Crankshaft. Engine: Continental O-470.
E270 Cessna 185E	28 Aug 76	0 S	Wainwright, Alas. USA. Throttle-power lever assemblies, support shaft for bellcranks failed.
E297 Cessna A185E	30 Oct 77	0 S	80 mi. SE Cornerbrook, Nfld. Canada. Air valve shaft in air intake box. Fastener hole drilled oversize and off-centre.
E306 Cessna 185 Skywagon	14 Jun 78	0 S	Chilliwack, B.C. Canada. Continental IO-520 engine. Induction airbox shaft, providing pivot on throttle bellcrank.
E360 Cessna 185	17 Jun 80	0 S	Iliamna, Ak. USA. Mixture-control valve shaft, P/N 0750173-1, on induction system airbox.
<u>Propeller</u>			
F16 Cessna 185	13 Apr 64	0 S	Sullivan Bay, B.C. Canada. Propeller blade at thread roots.
F53 Cessna 185C	18 May 67	0 S	Houma, La. USA. Propeller blade (next to hub).
F106 Cessna 185	1972	0 S	Albany, WA, Australia. Propeller detached.
F116 Cessna 185E (floats)	5 Oct 72	0 S	Keswick, Ont. Canada. Propeller blade actuating pin (incorrect washer installed).

AIRCRAFT TYPE (FIXED-WING)

F149 Cessna 185	24 Jun 75	0	S Churchill, Man. Canada. Propeller (severe dent on leading edge).
F219 Cessna 185 Skywagon	23 Mar 80	0	S Dawson City, Y.T. Canada. 30" of blade shed (nick). 379 airframe hrs
<u>Landing Gear</u>			
G269 Cessna 185A	1970	0	S Moora, W.A., Australia. Port undercarriage main leg.
G289 Cessna 185	26 Nov 70	0	S Glenallen, Alas. USA. Right gear strut spring.
G299 Cessna 185A	1971	0	S Geraldton, WA, Australia. Cross tube of tailwheel.
G300 Cessna 185	1971	0	S Geraldton, WA, Australia. Nosewheel on port float (faulty bolt).
G306 Cessna 185	12 Mar 71	0	S Tasman Glacier, New Zealand. Port gear leg (axle attachment).
G402 Cessna 185A	3 Aug 75	0	S Casper, Wy. USA. Left main wheel outer half (crack in rim).
G416 Cessna 185A	1976	0	S Wilton, NSW, Australia. Right outboard landing gear support bracket.
G452 Cessna 185 Skywagon	6 Nov 77	0	S Winnipeg Beach, Man. Canada. Left landing gear leg at wheel axle mount (2 axle bolt mounting holes).
G478 Cessna 185 Skywagon (skis)	6 Feb 79	0	S Granville Lake, Man. Canada. Left gear attachment casting.
G496 Cessna 185 Skywagon (skis)	29 Feb 80	0	S Poplar Point, Sask. Canada. Left outboard landing gear support bracket.
G499 Cessna 185 Skywagon	14 Mar 80	0	S Baie Johan Beetz, Que. Canada. Right ski support bracket. 2262 airframe hours.
G500 Cessna 185 Skywagon	15 Mar 80	0	S Pikangikum, Ont. Canada. Right main gear support bracket at rivet hole in upper beam at front slot corner. Excessive free play at leg root caused fretting. 3519 airframe hours.
G525 Cessna 185 Skywagon (skis)	28 Mar 81	0	S Lac Pletipi, Que. Canada. Right main gear support bracket (fatigue corrosion).

CESSNA 188 AGWAGON/AGPICKUP/AGTRUCK/AGHUSKY

<u>Tail</u>			
B27 Cessna A188B	25 Jul 74	0	S Fairfax, S.C. USA. Right horizontal stabilizer rear spar and channel assembly.

<u>Engine</u>					
E180 Cessna A188	7 Dec 72	0	S	Ashley Gorge, New Zealand. No. 4 connecting rod.	4363 hours.
<u>Propeller</u>					
F118 Cessna A188-A					
F145 Cessna A188A	15 May 75	0	S	Merced, Cal. USA. Propeller hub.	
F215 Cessna A188A AGwagon	5 Nov 79	0	S	Stratford, New Zealand. Threaded shank of prop failed at 593 hours.	UNS A92025 wrought Al alloy.
F226 Cessna A188B	1981	0	S	Naradhan, NSW, Australia. Propeller shaft.	
F230 Cessna A188B	7 Aug 81	0	D	Bastrop, La. USA. McCauley D2A34C-98-0 prop hub.	Inadequate inspection.
<u>Landing Gear</u>					
G245 Cessna A188	1969	0	S	Byabarra, NSW, Australia. Port spring leg at attachment to fuselage fitting.	Total time: 695 hours.
G264 Cessna A188	1970	0	S	Newrybar, NSW, Australia. Right gear leg fractured.	
G296 Cessna 188A	1971	0	S	Tumut, NSW, Australia. Left gear collapsed.	
G297 Cessna A188	1971	0	S	Goulbourn, NSW, Australia. Inboard attach bolt of right gear.	
G341 Cessna A188-A	1973	0	S	Geraldton, WA, Australia. Left mainwheel bolt.	
G362 Cessna A188	20 Nov 73	0	S	Awatoitoi Station, New Zealand. Port gear leg at fuselage.	Origin: fretting.
G375 Cessna A188B	30 Apr 74	0	S	Arcadia, Fla. USA. Left main gear spring retention bolt (NAS 152RB16).	
G461 Cessna 188	15 May 78	0	S	Cochran, Ga. USA. Main landing gear.	
G481 Cessna A188B	5 May 79	0	S	Newman, Cal. USA. Right main strut (approx 8" above wheel).	
G492 Cessna A188	1980	0	S	Dorriga, NSW, Australia. Tailwheel assembly.	
<u>Brake Line</u>					
H23 Cessna A188B	1977	0	S	Quairading, WA, Australia. Crack in port brake line.	

CESSNA 190

Landing Gear
 G271 Cessna 190 25 Feb 70 0 S Lewiston, Id. USA.
 Main gear assembly.

CESSNA 195

Wing
 A57 Cessna 195 1960 ? D USA.
 Wing failure. Wing carry-through.

A66 Cessna 195 1963 ? D USA.
 Wing failure. Wing carry-through.

Engine
 E28 Cessna 195 14 Jun 62 0 D Kaouk River, B.C. Canada.
 Crankshaft.

E118 Cessna 195 22 May 69 1 D Flat Lake, Ont. Canada.
 No. 4 & 5 conrods failed due to no. 4 knuckle pin failure.

Landing Gear
 G108 Cessna 195A 13 Apr 65 0 S Madison, Wis. USA.
 Cross-wind wheel spindle pivot pin bolt (left gear).

G222 Cessna 195 3 Nov 67 0 S Arcata, Cal. USA.
 Main gear. Origin: 1/4 inch drilled hole, right strut.

G252 Cessna 195 25 Apr 69 0 S Keene, N.H. USA.
 Right landing gear.

G262 Cessna 195 13 Nov 69 0 S Nashville, Tenn. USA.
 Left gear (wedges on outboard side of fuselage gear saddle).

G336 Cessna 195 23 Oct 72 0 S Santa Ana, Cal. USA.
 Gear collapsed.

G412 Cessna 195 4 Nov 75 0 S Elko, Nev. USA.
 Left spring steel gear leg.

G524 Cessna 195 22 Mar 81 0 S Redwood Falls, Mn. USA.
 Right gear spring, P/N 034-109-2.

Miscellaneous
 H16 Cessna 195A 5 Dec 68 0 S Paso Robles, Cal. USA.
 Left brake actuating rod.

CESSNA 206 SKYWAGON

Tail
 B17 Cessna U206B 19 Sep 71 1 D Anchorage, Alaska, USA.
 Vertical fin & rudder separated, cracks at attach points.

Engine/Transmission
 E111 Cessna P206 1969 0 S Port Headland, WA., Australia.
 No. 5 cylinder head at threads.

E189 Cessna U206	7 Mar 73	0	D Kihei, Hawaii, USA. Crankshaft at no. 2 journal.
E226 Cessna U206	15 Mar 75	0	S Kenai, Alas. USA. Crankshaft.
E235 Cessna 206B	23 Jun 75	0	S Imperial, Cal. USA. No. 3 cylinder conrod bolts.
E276 Cessna U206F	26 Feb 77	1	S Clarks Junction, New Zealand. Cracked tooth in camshaft cluster gear. Engine time: 671 hours.
E324 Cessna U206	1979	0	S Mt. Isa Qld., Australia. No. 6 cylinder separated (crack in flange). Loose hold-down nut.
E374 Cessna P206	1981	0	D Kilcoy, Queensland Australia. #4 cylinder exhaust valve.
E378 Cessna U206F	12 Jan 81	0	S Sherburne, Mn. USA. Crankshaft no. 2 main journal.
F67 <u>Propeller</u> Cessna 206	8 Feb 68	0	D E. Prairie, Miss. USA. Crankshaft imbalance caused prop failure.
F68 Cessna P206A	12 Feb 68	0	S Fort Madison, Iowa. USA. Propeller hub.
F111 Cessna P206	16 May 72	0	S Fremont, Cal. USA. Blade separated, crankshaft sheared at mounting flange.
F112 Cessna P206	18 May 72	0	S Huntington Beach, Cal. USA. Propeller blade.
F125 Cessna 206	9 Sep 73	0	S East Boston, Mass. USA. Propeller hub.
F127 Cessna 206F	3 Nov 73	0	S Nagoya, Japan. Screw parts of #2 prop blade.
F227 Cessna 206	3 Mar 81	0	S Lae, Papua New Guinea. Propeller blade.
F229 Cessna P206A	28 Jul 81	0	S Marathon, Fl. USA. McCauley hub model E2A34C74 separated. Dynamic dampener P/N 352117 beyond limits.
G331 <u>Landing Gear</u> Cessna TU206B	22 Jul 72	0	D Lone Pine, Calif. USA. Nose gear steering collar.
G476 Cessna U206	4 Jan 79	0	S Atmautluak, Ak. USA. Main landing gear.

G509 Cessna U206 28 Jul 80 0 S Kenai, Ak. USA.
Nosewheel upper torque link assembly, P/N
0442506-1.

CESSNA 207 SKYWAGON

Engine
E249 Cessna 207 1976 0 S Groote Eylandt, NT., Australia.
Muffler baffles separated from rods.

E342 Cessna 207 8 Sep 79 0 S Umiat, Ak. USA.
Crankshaft at no. 2 journal.

Propeller
F156 Cessna 207 10 Aug 75 0 S Topeka, Kans. USA.
Propeller hub. Counter wt and bushing wear
excessive.

CESSNA 210 CENTURION

Fuselage
C14 Cessna 210 5 Jul 64 0 S Richmond, Va. USA.
Fuselage bulkhead assembly P/N 1243022-1 failed.
Gear collapsed.

Engine
E57 Cessna 210E 19 Jul 65 0 S McCracken, Kans. USA.
No. 3 cylinder connecting rod.

E144 Cessna 210K Centurion 24 Mar 71 1 D Roganville, Texas, USA.
Fillets of no. 2 main journal.

E169 Cessna 210B 25 May 72 0 S Wappapello, Mo. USA.
1 cylinder cracked (inspection overdue).

E240 Cessna 210 4 Aug 75 1 S Hope, BC, Canada.
Connecting rod.

E254 Cessna 210 11 Jan 76 0 S Carpenteria, Cal. USA.
Crankshaft.

E262 Cessna 210C Centurion 7 May 76 1 D Florence, Oregon, USA.
Crankshaft failure. Main bearing mis-aligned,
wrong con rod bearings.

E268 Cessna 210 16 Aug 76 0 S Ellgau, W. Germany.
Connecting rod bearing due to bushing wear.

E273 Cessna 210B Centurion 21 Oct 76 1 S Granbury, Texas USA.
Hold-down studs of No. 5 cylinder (under-torquing)

E282 Cessna 210K 11 Jun 77 0 S Manor, Tex. USA.
Crankshaft.

E283 Cessna 210 Centurion 23 Jun 77 1 D Summerland Key, Florida USA.
Propeller cylinder separated, oil on windshield
restricted vision.

AD-A137 254

A SURVEY OF SERIOUS AIRCRAFT ACCIDENTS INVOLVING
FATIGUE FRACTURE VOLUME 1. (U) NATIONAL AERONAUTICAL
ESTABLISHMENT OTTAWA (ONTARIO) G S CAMPBELL ET AL.

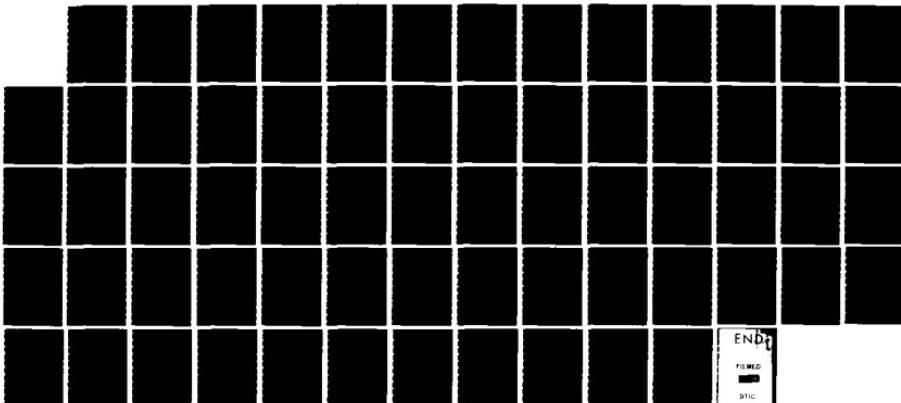
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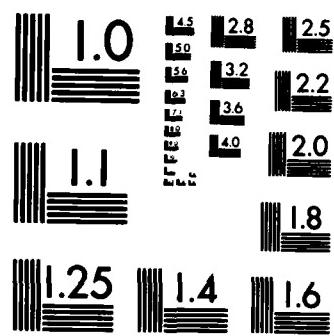
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F/G 1/2

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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

E299 Cessna T210L	23 Dec 77	0	S Moriarty, N.M. USA. Crankshaft. Previous prop strikes.
E303 Cessna 210-5	20 May 78	0	D Phoenix, Ariz. USA. Crankshaft.
E333 Cessna 210 Centurion	17 Apr 79	6	D Cable, Wi. USA. No. 3 exhaust valve.
E347 Cessna 210	19 Nov 79	0	S Beckwourth, Cal. USA. Crankshaft at no. 5 and 6 cylinder journals.
E361 Cessna P210	10 Jul 80	1	D Marcellus, Mi. USA. Cylinder separated after fatigue of under-torqued thru-bolts & hold-down studs.
E381 Cessna 210N	22 Feb 81	0	S Miyagi Pref., Japan. Piston pin.
<u>Propeller</u>			
F15 Cessna 210	1 Feb 64	0	S Bolivar, Mo. USA. Propeller blade.
F74 Cessna 210C	11 Sep 68	0	S Patricia, Tex. USA. Propeller blade failed approx. 5" from tip.
F130 Cessna 210-5A	1974	0	S Morwell, Vict. Australia. Propeller blade shed.
F136 Cessna 210K	18 Aug 74	0	D Joy, Ky. USA. Propeller blade.
F195 Cessna 210K	28 Apr 78	0	S Corona, N.M. USA. Propeller blade separated. Blades had previous damage straightened.
<u>Landing Gear</u>			
G64 Cessna 210	16 Jun 64	0	S Klamath Falls, Ore. USA. Nose gear hydraulic line assembly, P/N 1280106-3.
G69 Cessna 210	2 Aug 64	0	S St. Louis, Mo. USA. Piston rod of nose gear actuating hydraulic cylinder (threads).
G160 Cessna 210	22 Feb 66	0	S Lafayette, La. USA. Left main gear actuator spindle shaft.
G195 Cessna 210	17 Dec 66	0	S Newburyport, Mass. USA. Left main landing gear actuator assembly spindle. P/N ED11935L.
G229 Cessna 210	25 Feb 68	0	S Howell, Mich. USA. Nose wheel fork.
G244 Cessna 210B	1969	0	S Cudal, NSW, Australia. Port leg (saddle failed).

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AIRCRAFT TYPE (FIXED-WING)

G298 Cessna 210B	1971	0 S	Cudal, NSW, Australia. Actuator spindle (right gear).
G319 Cessna 210-5	1972	0 S	Surfers Gardens, Qld. Australia. Attachment bolt, right spring leg (wrong nut).
G340 Cessna 210A	1973	0 S	Groote Eylandt, NT, Australia. Shaft of spindle flange in port gear actuator.
G415 Cessna 210B	1976	0 S	Alice Springs, NT, Australia. Hydraulic actuator cracked.
G417 Cessna 210G	1976	0 S	Moorabin, Vict., Australia. Port main gear saddle assembly.
G425 Cessna 210H	16 Mar 76	0 S	Dothan, Ala. USA. Saddle fitting clamp of main gear.
G455 Cessna 210B	1978	0 S	Moorabbin, Vict., Australia. Right actuator spindle. Part not replaced.
G456 Cessna 210A	1978	0 S	Rockhampton, Qld. Australia. Hydraulic line between nose gear door actuator & up-lock actuator.
G457 Cessna 210H	1978	0 S	Toowomba, Qld., Australia. Left main gear saddle fractured (misrigging).
G458 Cessna 210L	21 Jan 78	0 S	Flagstaff, Ariz. USA. Left main gear downlock hook assembly, P/N 1241111-200.
H17 <u>Hydraulic Line</u> Cessna 210	1970	0 S	Archerfield, Qld. Australia. Hydraulic line. No fluid to lower gear.

CESSNA 305 BIRD DOG

<u>Landing Gear</u> G435 Cessna 305	25 Aug 76	0 S	Manhattan, Kans. USA. Main gear (broken bolt).
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CESSNA 310

E84 <u>Engine</u> Cessna 310	10 Jul 66	2 D	Longmont, Colo. USA. Fracture at poor weld in exhaust, caused fuel fire & separation of right wing.
E112 Cessna 310F	19 Feb 69	4 D	Reno, Nev. USA. Master & connecting rods.
E201 Cessna 310C	21 Nov 73	0 D	Montrose, Colo. USA. No. 1 cylinder barrel of engine separated.
F58 <u>Propeller</u> Cessna 310D	11 Sep 67	0 S	Clovis, N.Mex. USA. 1 foot of left propeller failed.

F76	Cessna 310B	27 Oct 68	0	S Zanesville, Ohio. USA. Blade of left propeller at hub spider.
F114	Cessna 310J	22 Aug 72	0	S Wichita Falls, Tex. USA. Propeller blade.
F124	Cessna 310I	18 Aug 73	0	S Miami, Fla. USA. Propeller (hub bolt holes).
F163	Cessna 310J	29 Jan 76	0	S Lubbock, Tex. USA. Blade separated from hub, right engine.
F174	Cessna 310L	21 Aug 76	0	S Carpenter, S.D. USA. Engine counterweight dampers out of tolerance. Engine mount structure bent. Fatigued prop hub.
G98	<u>Landing Gear</u> Cessna 310	18 Jan 65	0	S Rochester, N.Y. USA. Nose gear lock torque tube.
G133	Cessna 310C	6 Oct 65	0	S Pasco, Wash. USA. Right main gear oleo strut.
G152	Cessna 310C	22 Dec 65	0	S Memphis, Tenn. USA. Nose gear main drive tube assembly. P/N 0842120-1
G171	Cessna 310	29 Apr 66	0	S Concord, Cal. USA. Nose gear bell crank.
G184	Cessna 310F	13 Aug 66	0	S Chantilly, Va. USA. Nose gear actuating rod.
G190	Cessna 310H	27 Sep 66	0	S Purchase, N.Y. USA. Uplock torque tube (nose gear).
G237	Cessna 310	30 Aug 68	0	S Pittstown, N.J. USA. Torque tube assembly at LH bearing assembly.
G243	Cessna 310B-A1	1969	0	S Bankstown, NSW, Australia. Right main gear actuator tube (inboard rivet line). Previous buckling. Total time: 4830 hrs.
G491	Cessna 310	5 Dec 79	0	S Mackay, Qld. Australia. Right gear uplock actuating rod.
G498	Cessna 310I	7 Mar 80	0	S Mammoth Lakes, Ca. USA. Right main landing gear support forging, P/N 0822180-6.

CESSNA 320 SKYNIGHT

D28	<u>Flight Controls</u> Cessna 320B	6 Jun 75	0	S Bowling Green, Ky. USA. Elevator push-pull rod attach rivets.
G150	<u>Landing Gear</u> Cessna 320	18 Dec 65	0	S Teterboro, N.J. USA. Nose wheel drive tube

G382 Cessna 320B 17 Aug 74 0 S Sacramento, Cal. USA.
 Left uplock torque tube assembly support stud.
 Service letter not complied with.

Fuel Line
 H28 Cessna 320 8 Aug 77 0 S Tsuniah Lake, B.C. Canada.
 Skyknight Fuel vent line nipple in lower forward quadrant
 as viewed from outside. Similar failure on main
 fuel outlet. Airframe time 2100 hours.

CESSNA 336 SKYMASTER

Propeller
 F70 Cessna 336 4 Jul 68 0 S Finlay Forks, B.C. Canada.
 Rear propeller blade.

F168 Cessna 336 11 Mar 76 4 D McGregor, Iowa USA.
 Skymaster Propeller separated.

F193 Cessna 336 24 Apr 78 0 S Gisborne, New Zealand.
 Prop hub and retaining nut failed from fatigue.

CESSNA 337

Flight Controls
 D34 Cessna 337 30 Sep 77 0 S Kingston, Ont. Canada.
 Super Skymaster Upper rod, between bellcrank and elevator
 balance weight arm (threads). 3658 airframe hrs

Engine
 E223 Cessna 377 6 Dec 74 0 S Cabonga Reservoir, Que. Canada.
 Crankcase.

E227 Cessna T337 18 Mar 75 0 S Dubois, Id. USA.
 Line to fuel flow gauge.

Propeller
 F170 Cessna 337 4 May 76 0 S Barrow, Alas. USA.
 Rear prop dowel pin on pitch change mechanism.

CESSNA 402

Engine
 E233 Cessna 402A 15 Jun 75 0 S Seattle, Wash. USA.
 Exhaust manifold, right engine.

E295 Cessna 402B 29 Sep 77 2 D Mercer, Penn. USA.
 Crack in manifold couple permitted exhaust gas
 into wing, causing fire.

E318 Cessna 402B 7 Sep 78 0 D Hyder, Arizona USA.
 Fracture of exhaust system from excessive
 vibration. Bolt connecting ball joint on right
 side of left engine missing.

Landing Gear
 G275 Cessna 402 22 Apr 70 0 S Pembina, N.Dak. USA.
 Left main landing gear torque arm attach lug.

G410 Cessna 402A 13 Oct 75 0 D Miyako Airport, Japan.
 Side link support rib, left landing gear.

G438 Cessna 402B	7 Oct 76	0 S	Hachinoe, Japan. Torque arm support bracket, nose gear.
G471 Cessna 402	27 Sep 78	0 S	Indianapolis, Ind. USA. Landing gear cylinder and trunnion. P/N 504-1000-81.
G483 Cessna 402B	9 Jun 79	0 S	Kikaiga Island, Japan. Welding fitting part, left main gear torque tube.
G488 Cessna 402	8 Sep 79	0 S	Adelaide, SA, Australia. Starboard gear torque tube bellcrank (mis-rigging).
G508 Cessna 402B	3 Jul 80	0 S	Van Nuys, Ca. USA. Right main landing gear side brace lock link, P/N 5041001-2.

CESSNA 411

<u>Engine</u> E168 Cessna 411	30 Apr 72	0 S	Monticello, Miss. USA. # 1 & 2 cylinder exhaust valves (right engine).
<u>Landing Gear</u> G378 Cessna 411	1 Jun 74	0 S	Reno, Nev. USA. Bolt in right main gear retraction assembly.

CESSNA 421 GOLDEN EAGLE

<u>Engine</u> E250 Cessna 421B	1976	0 S	Norseman, WA, Australia. Broken weld joint on right-hand exhaust slip joint assembly.
<u>Landing Gear</u> G397 Cessna 421	16 May 75	0 S	Kuusamo Airfield, Finland. Bellcrank in nose gear retraction linkage.

CHAMPION CITABRIA

<u>Landing Gear</u> G279 Champion 7ECA	6 Aug 70	0 S	West Chester, Pa. USA. Left main gear attach bolt.
G287 Champion 7ECA	18 Nov 70	0 S	Dayton, Ohio. USA. Right axle at strut attach mounting pad.
G290 Champion 7ECA	28 Nov 70	0 S	Santa Ana, Cal. USA. Left main gear attach bolt. P/N AN7-26.
G307 Champion 7GCBC	23 May 71	0 S	Elsinore, Cal. USA. Left main landing gear attach bolt.
G321 Champion 7GCAA	3 Mar 72	0 S	Edgefield, S.C. USA. Left gear (attach bolt).
G338 Champion 7GCAA Citabria	1973	0 S	Mooroooduc Vic., Australia. Attach bolts, port gear.

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AIRCRAFT TYPE (FIXED-WING)

G398	Aeronca 7GCBC Citabria	14 Jun 75	0	S Frechen, W. Germany. Left main gear leg strut attachment below cowling.
G436	Champion 7ECA	4 Sep 76	0	S Charleston, S.C. USA. Right main gear attach bolts.
G437	Champion 7GCBC Citabria	18 Sep 76	0	S Winzeln, W. Germany. Shock strut of left main gear.
G446	Aeronca 7GCBC Citabria	16 Jul 77	0	S Albstadt-Degerf., W. Germany. Right main gear leg strut attachment below cowling.
G468	Bellanca 7ECA Citabria	20 Aug 78	0	S Rockton, Ont. Canada. Left undercarriage leg. 1268 airframe hours.
G469	Bellanca 7GCBC Citabria	15 Sep 78	0	S Thorton, Co. USA. Left main wheel axle.
G502	Champion 7ECA Citabria	6 Apr 80	0	S Joliette Airport, Que. Canada. Main gear leg through-bolt (bolt undertorqued). 2260 airframe hours.
G522	Bellanca 7ECA Citabria	4 Mar 81	0	S Snow Lake, Man. Canada. Ski axle along weld between it and mounting flange.
G540	Champion 7ECA Citabria	20 Jan 82	0	S St. Jean, Que. Canada. Ski right gear leg at fuselage attachment (corrosion pits).

CHAMPION TRI-TRAVELER

<u>Propeller</u>				
F186	Champion 7FC	20 Aug 77	0	S Moline, Ill. USA. Propeller blade.
<u>Landing Gear</u>				
G104	Champion 7FC Tri-Traveller	21 Feb 65	0	S Milton, Fla. USA. Nose gear fork.

COMMONWEALTH CA-28 CERES

<u>Engine</u>				
E202	C.A.C. Austrl. CA-28C Ceres	1974	0	S Glen Innes, NSW, Australia. Cylinder assembly.
E375	Commonwealth CA-28 Ceres	1981	0	S Glenreagh NSW, Australia. No. 3 cylinder exhaust rocker arm cover.
<u>Brake Line</u>				
H20	C.A.C. Austrl. CA-28C Ceres	1973	0	S Leeton NSW, Australia. Port brake line at work hardened area.

COMMONWEALTH 185

<u>Landing Gear</u>				
G316	Commonwealth 185	20 Sep 71	0	S Mesa, Ariz. USA. Right landing gear tube.

CONSOLIDATED PBY CATALINA

Landing Gear
 G286 Consolidated 14 Nov 70 0 S Christiansted, Vi. USA.
 28-5AC PBY
 Catalina Left main gear hydraulic actuator.

CONVAIR B-36

Wing
 A35 Convair B-36 1952 ? ? ?
 (USAF) or 1953 Wing failure.

Tail
 B7 Convair B-36 1953-59 ? ? ?
 (USAF) Tail failure.

Landing Gear
 G5 Convair B-36 1953-59 ? ? ?
 (USAF) Starboard landing gear (threads).

CONVAIR 240/340/440/580/600

Engine
 E11 Convair 240 4 Aug 55 11 D Fort Leonard Wood, Missouri, USA.
 Crack in cylinder wall of engine, causing fire & separation of wing. Unairworthy cylinder installed.

E164 Convair 600 16 Feb 72 0 S Beaumont, Tex. USA.
 Low pressure impeller (right engine).

Propeller
 F35 Convair 240 12 May 66 0 S Fort Worth, Tex. USA.
 Right engine no. 3 propeller blade.

F46 Convair 340 5 Mar 67 38 D Marseilles, Ohio. USA.
 4 propeller blades separated. Helical splines of torque piston failed because of omission of nitriding process. Torque cylinder of blade pitch change unit failed from fatigue.

Landing Gear
 G42 Convair 440 1 Nov 63 0 S Atlanta, Ga. USA.
 Wheel axle of left main gear. Origin: fillet at flange.

G257 Convair 600 1 Aug 69 0 S Houston, Tex. USA.
 Nose gear retract cylinder rod.

G293 Convair 580 23 Dec 70 0 S Kansas City, Mo. USA.
 Left main landing gear inboard strut outer cylinder.

G324 Convair 600 8 May 72 0 S Alexandria, La. USA.
 Nose gear piston rod.

G352 Convair 580 12 Jun 73 0 S Pittsburgh, Pa. USA.
 Nose gear upper left drag strut.

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AIRCRAFT TYPE (FIXED-WING)

G477 Convair 580 19 Jan 79 0 S St. Louis, Mo. USA.
Nose gear drag strut, PLN 340-5210105.

CONVAIR 990

G256 Landing Gear Convair 990 29 Jul 69 0 S Fort Worth, Tex. USA.
(American) Landing gear support beam.

COONEY R-1 TOMCAT

E108 Engine Cooney R-1 24 Sep 68 0 S Lamoni, Iowa. USA.
Tomcat Crankshaft.

CROPMASTER YA1-25

G267 Landing Gear Cropmaster 1970 0 S Cudgewa Vic., Australia.
YA1-25 Main gear strut plunger.

CULVER V

G75 Landing Gear Culver V 9 Sep 64 0 S Pacoima, Cal. USA.
Right gear retract push-pull tube.

CURTISS AT-32 CONDOR II

A2 Wing Curtiss 27 Jul 34 11 D Tuttelingen, Germany.
AT-32 Port inter-wing strut failed, causing
Condor II separation of engine & part of lower wing.

CURTISS C-46 COMMANDO

A59 Wing Curtiss 15 Oct 60 2 D Plain City, Utah USA.
C-46F Right wing separated. Lower attach angle bolts
holding forward portion of outer wing to centre
section.

B24 Tail Curtiss 17 Dec 73 3 D Coyhaique, Chile.
C-46A Elevator separated (elevator hinge pins?).

E6 Engine Curtiss 16 Dec 51 56 D Newark, N.J. USA.
C-46F Hold-down studs of # 10 cylinder, right engine.

E13 Curtiss C-46F 6 Nov 57 2 D Guatemala City, Guatemala.
Crankshaft of port engine.

E18 Curtiss C-46 29 Jan 60 0 D Port Hardy, B.C. Canada.
Reduction drive ring gear in right engine.

E19 Curtiss 5 Apr 60 2 D Siuna Aerodrome, Nicaragua.
C-46A Port engine failed due to fatigue of
distributor valve of port propeller.

E23 Curtiss 22 Jan 61 2 D Katy, Texas, USA.
C-46F No. 8 cylinder hold-down studs. Uncontrollable
fire & separation of wing.

E24	Curtiss C-46F	28 Aug 61	0	S	Fairbanks, Alaska. USA. Holddown studs, no. 8 cylinder, left engine.
E59	Curtiss C-46A	12 Aug 65	13	D	Barra do Bugres, Brazil. Bolts of no. 8 cylinder, left engine. Engine fire caused wing separation
E296	Curtiss C-46	29 Sep 77	0	S	Thompson, Man. Canada. Pratt & Whitney R-2800 engine. Low oil pressure due to small piece of failed piston skirt which became wedged under oil pressure relief valve.
<u>Landing Gear</u>					
G16	Curtiss C-46F	9 Sep 59	0	S	Dallas, Tex. USA. Front spar attachment fittings of right gear (bolt hole).
G29	Curtiss C-46F	10 Mar 61	0	S	St. Louis, Mo. USA. Left main gear, drag link assembly.
G38	Curtiss C-46	5 Jun 62	0	S	San Juan, Puerto Rico. Side brace, left main gear (improper machining)
G41	Curtiss C-46	5 Sep 63	0	S	Anchorage, Alaska USA. Hydraulic pressure line, external ground service fitting, right gear.
G43	Curtiss C-46A	1 Jan 64	0	S	Hill AFB, Ut. USA. Main landing gear.
G102	Curtiss C-46	8 Feb 65	0	S	Atlanta, Ga. USA. Left landing gear. TSO 12457 hours.
G125	Curtiss C-46F	31 Aug 65	0	S	Atlanta, Ga. USA. Gear collapsed. Improperly fabricated hose, wrong bolt.

CURTISS SB2C HELLDIVER

<u>Tail</u>					
B4	Curtiss SB2C Helldiver (USAF)	WWII	?	D ?	Lost horizontal tail. Cracks found in tails of other SB2C and Brewster SB2A aircraft. Attributed to structural response to unsteady airloads

DASSAULT MIRAGE III

<u>Engine</u>					
E170	Dassault Mirage III (RAAF)	17 Jul 72	0	D	Butterworth, Malaysia. 7th stage compressor rotor ring. Manufacturing defect. Elongation of rivet holes.
E209	Dassault Mirage III (RAAF)	1 Apr 74	0	D	Butterworth, Malaysia. Compressor first stage blade (manufacturing defect).

DE HAVILLAND D.H. 82 TIGER MOTH/QUEEN BEE

Engine E252 de Havilland 82 1976 0 S Taree NSW, Australia.
Rocker bracket bolts, no 4 cylinder.

G490 Landing Gear
de Havilland 14 Oct 79 0 S Cypress, Tex. USA.
DH-82A Eye on right axle assembly failed (where
Tiger Moth compression strut was attached).

DE HAVILLAND D.H. 104 DOVE

Wing
A33 D.H. 104 Dove 15 Oct 51 7 D Kalgoorlie, Western Australia.
Left wing failure. Crack in channel section,
centre section spar. Matl: DTD 363 (equiv
75ST). 8977 airframe hours.

A92 D.H. 104 28 Jan 70 9 D Cleveland, Ohio, USA.
Dove Wing separation. Lower right wing/fuselage root joint attach fitting. Material: steel. Airframe hours: 9384.

A98 DH 104-7 AXC 6 May 71 12 D Coolidge, Ariz. USA.
Dove Right wing failure. Lower main root joint
fitting. Fatigue propagated in area of
corrosion & fretting.

G52 Landing Gear de Havilland 25 Mar 64 0 S Hilo, Hawaii. USA.
104-5 Dove Main gear collapsed.

G322 de Havilland 14 Mar 72 0 S San Juan, Puerto Rico.
DH-104 Dove Left main gear actuating piston. P/N AHO 19742.

DE HAVILLAND D.H. 114 HERON

F41 Propeller
de Havilland 3 Aug 66 0 S San Juan, Puerto Rico.
114 Heron No. 4 propeller separated (prop barrel).

F153 de Havilland 11 Jul 75 O S San Juan, Puerto Rico.
D.H.114 Heron Propeller blade.

G200 Landing Gear D.H. 114 25 Feb 67 0 S Montego Bay, Jamaica.
Heron 1B Left axle plug, nose gear.

DE HAVILLAND COMET 1

Fuselage C6 D.H. Comet 1 10 Jan 54 35 D Mediterranean Sea off Elba, Italy.

C7 D.H. Comet 1 8 Apr 54 2 D Med'erranean Sea off Naples, Italy.
Fr. glage fatigue failure. Origin: ADF window

DE HAVILLAND COMET 4

<u>Engine</u>					
E29	de Havilland	11 Oct 62	0	S London, UK.	
	Comet 4			'O' stage compressor blade, no. 3 engine.	
E178	de Havilland	3 Nov 72	0	S Benina, Libya.	
	Comet 4C			No. 2 engine, H.P. turbine disk (P/N BR 54658A) at rim.	
<u>Landing Gear</u>					
G51	de Havilland	22 Mar 64	0	D Singapore.	
	Comet 4			Right landing gear main forging at gear leg.	
G333	de Havilland	20 Aug 72	0	S Salzburg, Austria.	
	Comet 4			Nose wheel jack piston head.	

DE HAVILLAND DHC-1 CHIPMUNK

<u>Engine</u>					
E34	de Havilland	26 Apr 64	0	S Orillia, Ont. Canada.	
	DHC-1 Chipmunk			Crankshaft at tapered propeller end. Caused prop separation.	
<u>Propeller</u>					
F12	de Havilland	18 Jun 62	0	S Winnipeg, Man. Canada.	
	DHC-1 Chipmunk			Prop blade shed just outboard of attaching bolts (fretting from inadequate torquing).	

DE HAVILLAND DHC-2 BEAVER

<u>Wing</u>					
A69	de Havilland	10 Sep 63	1	D Armidale, Australia.	
	DHC-2 Beaver			Wing failure (strut attachment fitting).	
A76	de Havilland	Jul 64	1	D Australia.	
	DHC-2 Beaver			Wing failure (strut attachment fitting).	
A136	de Havilland	1 Aug 81	1	S Big Hook Lake, Ont. Canada.	
	DHC-2 Beaver			Left wing separated (upper fitting of strut assembly). Strut had improperly-formed fillet radius and was not removed from service as per AD. 7228 airframe hours.	
<u>Tail</u>					
B36	D.H. DHC-2	6 Dec 79	1	D Captain's Flat, NSW, Australia.	
	Mk.1 Beaver			Vertical stabilizer separated. Mounting bracket P/N C2TF13. Attach fitting damaged in prior accident. Role: agricultural.	
<u>Engine</u>					
E264	de Havilland	2 Jul 76	0	S The Martin Hills, NWT. Canada.	
	DHC-2 Mk I			Unapproved hard brass fitting on fuel line inlet to carburetor.	
E338	de Havilland	25 Jul 79	0	D Yarrowitch NSW, Australia.	
	DHC-2 Beaver			Cracked cylinder head.	
E363	de Havilland	7 Aug 80	0	S Bartlett's Pond, Nfld. Canada.	
	DHC-2 Mk I Beaver			No. 2 cylinder head separated from barrel. Pratt & Whitney R-985 engine.	

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AIRCRAFT TYPE (FIXED-WING)

E368 de Havilland 10 Sep 80 3 D Whitehorse, Yukon Canada.
DHC-2 Mk.1
Beaver No. 3 piston pin. Initiated by corrosion
pitting on pin surface.

DE HAVILLAND DHC-3 OTTER

Engine
E22 de Havilland 16 Sep 60 0 S Frobisher Bay, NWT. Canada.
DHC-3 Otter Crankshaft at mating splines between front and
rear halves.

E82 de Havilland 16 Jun 66 0 S Pocketknife Creek, B.C. Canada.
DHC-3 Otter Bushing in no. 2 cylinder exhaust rocker box
casting.

E236 de Havilland 25 Jun 75 0 S Unnamed lake, Que., Canada.
DHC-3 Otter Crack in valve rocker arm housing resulted in
valve failure.

Landing Gear
G217 de Havilland 6 Aug 67 0 S Cape Sparbo, NWT. Canada.
DHC-3 Otter Main gear attachment bolt.

G445 de Havilland 14 Apr 77 0 S GB-1, Que. Canada.
DHC-3 Otter Bolt holding right gear strut to the fuselage
(lubrication hole). Service bulletin not
complied with.

DE HAVILLAND DHC-6 TWIN OTTER

Propeller System
F209 de Havilland 27 Feb 79 0 S Cheyenne, Wy. USA.
DHC-6 Propeller system: control unit, PCV - fatigue
Twin Otter fracture.

Landing Gear
G495 de Havilland 7 Feb 80 0 S College Station, Tx. USA.
DHC-6 Right lower landing gear leg separated at
Twin Otter Y-joint.

DORNIER MERKUR

Wing
A1 Dornier 23 Sep 27 6 D Schleiz, Thuringen, Germany.
Merkur Wing failure. Wing strut close to upper attach-
ment point.

DORNIER 27

Engine
E309 Dornier 27 Jun 78 0 D Varberg, W. Germany.
DO 27B-1 Exhaust valve of cylinder #2.

DOUGLAS A-26/B-26 INVADER

Wing
A70 Douglas B-26 7 Jan 64 2 D Vietnam.
Invader (USAF) Wing failure, main spar. Role: counter-insur-
gency.

A71	Douglas B-26 Invader (USAF)	9-15 Feb 64	2	D Vietnam. Wing failure, main spar. Role: counter-insurgency.
A74	Douglas B-26 Invader (USAF)	Apr 64	2	D Elgin Air Force Base, Fla. USA. Left wing separated. Failure of lower spar cap. Role: Ground attack (strafing)
A134	Douglas B-26 (Calspan variable- stability aircraft)	3 Mar 80	3	D Near Edwards AFB, Cal. USA. Left wing failure. Front lower forward spar cap at WS 140 (most outboard bolt hole attaching spar to nacelle fittings). 9467 airframe hours.
<u>Landing Gear</u>				
G230	Douglas A-26 Invader	16 Mar 68	0	S Kansas City, Kans. USA. Right gear trunnion pivot fittings.

DOUGLAS DC-3/C-47/DAKOTA

<u>Wing</u>				
A85	Douglas DC-3	8 Apr 68	36	D Coyhaique, Chile. Starboard wing failure.
A104	Douglas DC-3	10 Sep 72	11	D Dabark, Ethiopia. Right wing separated. Wing-to-centre section attachment.
A106	Douglas DC-3	23 Feb 73	1	D Seddon, New Zealand. Separation of right wing. Lower centre wing wrap-around & internal doublers, inboard of WS 142. Role: fertilizing. Airframe hours: 24,261 including 1503 in agricultural role.

<u>Engine</u>				
E2	Douglas DC-3	16 May 46	27	D Richmond, Va. USA. Crack in no. 6 cylinder of left engine.
E3	Douglas DC-3	21 Aug 46	2	D Moline, Ill. USA. No. 5 cylinder at barrel between fins & flange.
E5	Douglas Dakota	30 Jul 48	0	D Sywell, UK. Malfunction of starboard engine, constant speed unit due to fatigue failure of filter gauze.
E7	Douglas DC-3	4 Feb 52	16	D Kitwit, Belgian Congo. No. 6 piston lug failed, shearing off prop
E21	Douglas DC-3	6 Sep 60	0	S Des Moines, Iowa, USA. No. 10 cylinder exhaust insert mounting of right engine.
E27	Douglas Dakota	24 May 62	4	D Rajshani, E. Pakistan. Port engine.
E38	Douglas DC-3	19 Aug 64	0	D Tonopah, Nevada, USA. Fractures of right engine no. 12 cylinder, and left engine front master rod bearing.

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AIRCRAFT TYPE (FIXED-WING)

E154	Douglas DC-3C	11 Oct 71	0	S	New Braunfels, Tex. USA. Fuel pressure ind/oil dilution restrictor fitting on right carb.
E239	Douglas Dakota (RAAF)	9 Jul 75	0	S	Sale, Vic., Australia. R.h. engine, fracture of rear master connecting rod cap.
F2	<u>Propeller</u> Douglas DC-3	11 Jan 46	0	S	Indianapolis, Ind. USA. Right propeller.
G10	<u>Landing Gear</u> Douglas DC-3	22 Jan 59	0	S	Huntington, WV USA. Centre wing to drag strut attach fitting, at lower attach bolt holes.
G18	Douglas DC-3	23 Dec 59	0	S	Tyler, Tex. USA. Brace strut of right gear.
G24	Douglas DC-3	13 Aug 60	0	S	Madison, Wis. USA. Strut brace fitting of left gear.
G35	Douglas DC-3	5 Mar 62	0	S	Sugluk, Que. Canada. Upper truss of right main undercarriage near front gusset.
G44	Douglas C-47	11 Jan 64	0	S	Porto Alegre, Brazil. Starboard landing gear.
G74	Douglas C-47	8 Sep 64	0	S	Idiris Airport, Libya. Left-hand brace strut attach fitting.
G231	Douglas DC-3C	3 May 68	0	S	Jacksonville, Fla. USA. Bearing bolt P/N 111904-9-519B, left landing gear
G328	Douglas DC-3	12 Jul 72	0	S	Wapenamanda, Papua, New Guinea. Starboard gear Y fitting P/N 2116632 (bolt hole)
G485	Douglas DC-3C	22 Jul 79	0	S	Tampa, Fla. USA. Both arms of right gear, rear strut, P/N 211632-1.
H2	<u>Engine Mounts</u> Douglas Dakota (Canadian Forces)	14 May 51	4	D	Lac Boltier, Que. Canada. Engine bearers & reduction gear housing cracked. Port engine fell out, fracturing front spar, & port wing separated. Crack origin: engine-mount welds.
<u>DOUGLAS DC-4</u>					
E89	<u>Engine</u> Douglas DC-4	22 Sep 66	2	D	Bogota, Colombia. Failure of a number of teeth of pinion of governor control unit, causing engine overspeed
G91	<u>Landing Gear</u> Douglas DC-4	19 Nov 64	0	S	Norfolk, Va. USA. Right nosewheel yoke end fitting. 5568 hr on part

G235 Douglas DC-4 26 Jun 68 0 S Launceston, Australia.
 Bolt attaching lower torque link to nose-wheel fork.

DOUGLAS DC-6

A34	<u>Wing</u> Douglas DC-6	1952	0	S ?	Failure of front spar cap, and bottom skin and stringer panel between front & centre spar cap. Origin: bolt hole connecting engine attachment angle to front spar. Material: 75ST. 13,000 airframe hours. Aircraft landed safely.
C19	<u>Fuselage</u> Douglas DC-6B	24 Feb 67	0	S North Holmdel, N.J. USA. Fuselage: skin and attachments, 60" x 125" hole torn aft crew compartment door. 37,264 airframe hours.	
F5	<u>Propeller</u> Douglas DC-6	21 Aug 50	1	S Eagle, Colo. USA. Propeller blade. Origin: scratch on blade.	
F10	Douglas DC-6A	21 Jun 59	0	D Shannon, Ireland. No. 1 blade of no. 4 prop. Previous blade bending disrupted compressive stresses in shot peened area.	
F17	Douglas DC-6B	14 Apr 64	0	S Melbourne, Australia. No. 3 blade of no. 3 prop (8.5" from butt end). Origin: surface burn (electrical?).	
F165	Douglas DC-6	8 Feb 76	3	D Van Nuys, Calif. USA. Prop blade. Leading edge under de-icer boot.	
G31	<u>Landing Gear</u> Douglas DC-6B	26 Jun 61	0	S Miami, USA. Landing gear uplatch release cable.	
G36	Douglas DC-6	7 Mar 62	0	S Buffalo, NY. USA. Right main-gear oleo strut.	
G121	Douglas DC-6A	15 Aug 65	0	S Boston, Mass. USA. Nose gear scissor torque link. P/N 8488A-46-1.	
G199	Douglas DC-6B	22 Feb 67	0	S Martha's Vineyard, Mass. USA. Left landing gear strut piston.	
G283	Douglas DC-6B	5 Nov 70	0	D Kerkyra, Greece. Upper torque link of nose gear.	
G292	Douglas DC-6B	19 Dec 70	0	S Malaga, Spain. Attachment fitting securing the recovery spring cable to lower end of left landing gear leg.	
G407	Douglas DC-6B	24 Sep 75	0	S Cleveland, Oh. USA. Corner radius of reworked nose gear assembly.	

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AIRCRAFT TYPE (FIXED-WING)

G505 Douglas DC-6 10 Jun 80 0 S Indianapolis, In. USA.
Nosewheel steering, upper torque link. P/N
8488A-46-1.

DOUGLAS DC-7

C8 Fuselage
Douglas DC-7 18 Jan 57 0 S New Orleans, La. USA.
Mild explosive decompression. Fuselage cracks
in area of forward crew entrance & cargo doors

E12 Engine
Douglas DC-7C 29 Oct 57 0 S Off US coast, NY/Copenhagen.
No. 1 engine impeller drive gear.

E14 Douglas DC-7C 25 Mar 58 9 D Miami Fla. USA.
No. 11 cylinder of no. 3 engine, approx 1 1/2
inches above mounting flange on thrust side.

G40 Landing Gear
Douglas DC-7B 12 Mar 63 0 S Boston, Mass. USA.
Right main l/g shock strut cylinder at fillet
of torque link lugs. 14,000 hours.

DOUGLAS DC-8 (See McDonnell Douglas DC-8)

DOUGLAS DC-9 (See McDonnell Douglas DC-9)

DUTTON SPL J-4

E114 Engine
Dutton SPL J-4 13 Apr 69 0 S Mesa, Ariz. USA.
Crankshaft at propeller flange. (Previous damage)

DYKE DELTA

E315 Engine
Dyke JD-1 5 Aug 78 0 S Fort Bridger, Wy. USA.
Delta Exhaust muffler broke loose from fatigue.

G466 Landing Gear
Dyke Delta JD-2 6 Aug 78 0 S Little Rock, Ark. USA.
Gear locking mechanism: forward bottom portion
of landing gear handle.

ERCO ERCOUPE 415-C

D25 Flight Controls
Ercoupe 415-C 22 Mar 75 1 D Fulton, Mo. USA.
Right aileron push-pull control rod broken.

D32 Ercoupe 415-C 15 Jun 77 2 D New Bedford, Mass. USA
Ercoupe Left horizontal member of T-control yoke
(weld). Hydrogen embrittlement & fatigue.

F29 Propeller
Ercoupe 415C 6 May 65 0 S Carlsbad, Cal. USA.
Propeller failure (taper hub), improperly
secured prop hub bolts.

G255 Landing Gear
Ercoupe 415-C 29 Jun 69 0 S Bradford, Pa. USA.
Ercoupe Nose wheel steering ball joint fitting.

FAIRCHILD C-119 PACKET

F7 Propeller
Fairchild C-119 Packet Nov 52 9 ? Billings, Montana USA.
Propeller blade broke 46 inches from tip.
Vibration pulled engine out of nacelle.

FAIRCHILD F-27 (See Fokker F-27)

FAIRCHILD SWEARINGEN (See Swearingen)

FAIREY GANNET

B10 Tail
Fairey Gannet (RAN) 30 Jan 59 1 D Sydney, Australia.
Tail plane assembly detached.

H10 Arrestor Hook
Fairey Gannet (RAN) 23 Mar 65 1 D At sea, HMAS Melbourne.
Bill of arrestor hook broke during landing.

FFA DIAMANT (SAILPLANE)

A120 Wing
FFA Diamant 16.5 sailplane 17 Apr 77 1 D Omemee, Ont., Canada
Separation of right wing. Crack in root web.
Areas of root web had a lack of bonding.
Material: fiberglass. Airframe hours: 784.

FLEET MODEL 1

F36 Propeller
Fleet Model 1 15 May 66 0 S St. Petersburg, Fla. USA.
Propeller hub.

FLEET MODEL 80 CANUCK

E25 Engine
Fleet 80 Canuck 9 Oct 61 0 S Trinity Bay, Que. Canada.
Left-rear cylinder hold down studs.

G204 Landing Gear
Fleet 80 Canuck (skis) 24 Mar 67 0 S Wawa, Ont. Canada.
Left undercarriage axle at machine mark.

FLETCHER FU-24

E174 Engine
Fletcher FU-24 14 Sep 72 0 S Ngaroma, New Zealand.
Camshaft gear, P/N 632893.

F96 Propeller
Fletcher FU-24-950 10 May 71 0 S Capr Runaway, New Zealand.
Pitch-change actuating pin of propeller blade
(root radius).

F120 Fletcher FU-24 3 Apr 73 0 S Waotu, New Zealand.
Propeller at blade root.

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AIRCRAFT TYPE (FIXED-WING)

Landing Gear

G421 Fletcher 21 Jan 76 0 S Palmerston North, New Zealand.
FU-24 Brackets which attach to piston & scissors link
(weld).

FOKKER DR-1

B26 Tail Fokker DR-1 14 Jul 74 0 S Tehachapi, Cal. USA.
Rudder post failed above upper hinge. Rudder
folded to horizontal position.

FOKKER F-27 FRIENDSHIP

A87 Wing Fairchild 2 Dec 68 39 D Pedro Bay, Alaska, USA.
Hiller F-27B Separation of right wing, WS 197. Cracks at
fastener holes in wing skin at tank access door

Engine

E177 Fokker F-27 15 Oct 72 0 S Rome, Italy.
Low pressure impeller.

E203 Fokker F-27 6 Mar 74 0 S Khartoum, Sudan.
Rear hub face of impeller (fretting). No. 2
engine.

E331 Fokker F-27 29 Mar 79 17 D Quebec City, Que. Canada.
Engine failure from crack in engine compressor,
low-pressure impellor, Dart engine.

Landing Gear

G28 Fokker F-27 17 Feb 61 0 S Goldsboro, N.C. USA.
Upper drag strut hinge pin bolt (right gear).

G479 Fokker F-27 10 Mar 79 0 S Birmingham Airport, UK.
Nose gear attachment lugs (corrosion pit).

FOLLAND GNAT

B18 Tail Folland 13 Dec 71 2 D Upper Heyford, UK.
Gnat T Mk 1 Fin separated (attachment lugs). Role:
(Royal AF) aerobatic demonstration team.

FUJI FA 200 AERO SUBARU

F143 Propeller Fuji FA 200- 6 Mar 75 0 S Hokkaido, Japan.
180 Aero Subaru Screw parts of #2 prop hub.

F160 Fuji FA 200- 10 Nov 75 0 S Oita, Japan.
160 Aero Subaru Prop blade (stone pit at back side).

FUNK F-23

F54 Propeller Funk 26 Jun 67 0 S Alliance, Neb. USA.
F-23A Propeller hub at blade attach point.

GENERAL AIRCRAFT CYGNET II

Engine
E120 General 26 Aug 69 2 D Woerth, Bas-Rhin, France.
Aircraft 42 No. 3 connecting rod.
Cygnet II

GENERAL DYNAMICS F-16

Engine
E354 General 26 Mar 80 0 D Hill AFB, Utah USA.
Dynamics F-16 9th stage compressor disk on Pratt & Whitney
(USAF) F100 engine. Engine time: 258.3 hours.

GENERAL DYNAMICS F-111

Wing
A91 General 22 Dec 69 2 D Nellis AFB, Nevada USA.
Dynamics Left wing separated. Lower attachment plate of
F-111A (USAF) wing pivot assembly contained an initial flaw
(D6ac steel). Airframe hours: 105.

Flight Controls
D15 General 28 Mar 68 2 D Thailand.
Dynamics Failure in lock weld on rod end in control
F-111A valve assembly controlling hydraulic actuators
(USAF) of tailplane. Aircraft not recovered.

D16 General 30 Mar 68 0 D Thailand.
Dynamics Failure in lock weld on rod end in control
F-111A valve assembly controlling hydraulic actuators
(USAF) of tailplane. A/c not recovered.

D17 General 22 Apr 68 2 D Thailand.
Dynamics Failure in lock weld on rod end in control
F-111A valve assembly controlling hydraulic actuators
(USAF) of tailplane. Aircraft not recovered.

D18 General 8 May 68 0 D Nevada, USA.
Dynamics Failure in lock weld on rod end in control
F-111A valve assembly controlling hydraulic
(USAF) actuators of tailplane.

GLASFLUEGEL STANDARD LIBELLE (SAILPLANE)

Flight Controls
D42 Glasfluegel 1 May 80 0 S Tauberbischofs, W. Germany.
Standard Libelle Elevator drive in region of stick.

GLENDENING STITS (See Stits)

GLOBE GC-1B

Engine
E45 Globe 27 Mar 65 0 S New Carlisle, Ohio. USA.
GC-1B No. 2 piston.

E195 Globe GC-1B 28 Jul 73 0 D Ballston Spa, N.Y. USA.
Fuel line to carburettor.

E280 Globe GC-1A 5 Jun 77 1 S Erding, West Germany.
Rocker arm for exhaust valve.

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AIRCRAFT TYPE (FIXED-WING)

Propeller
F137 Globe GC-1B 20 Aug 74 1 S Manchester, Tenn. USA.
Prop hub, 21 inches from clamp assembly strap.

Landing Gear G240 Globe 12 Oct 68 0 S Washburn, Iowa, USA.
GC-1B Right gear actuating arm.

GREAT LAKES SPORT TRAINER

GRUMMAN AA-5 (See American AA-5)

GRUMMAN AGCAT

Engine Grumman G-164 8 Jun 65 0 S Tallulah, La. USA.
E52 AgCat No. 4 cylinder connecting rod.

E80 Grumman G-164 20 Apr 66 0 S Butte City, Cal. USA.
AgCat Wrist pin and link rod no. 1 cylinder.

E107 Grumman 16 Sep 68 0 S Ferriday, La. USA.
G-164A AgCat No. 9 cylinder head.

E190 Grumman G-164 30 Mar 73 0 S Knights Landing, Cal. USA.
AgCat No. 9 cylinder.

E192 Grumman G-164 2 Jun 73 0 S Church Point, La. USA.
AgCat Crankshaft.

E302 Grumman G-164 11 May 78 0 S Elton, La. USA.
AgCat Engine cylinder assembly.

E355 Grumman 19 Apr 80 O D Billings, Mont. USA.
G-164B AgCat Mixture push-pull rod fractured at thread.

E356 Grumman G-164 26 Apr 80 0 S Palermo, Ca. USA.
AgCat No. 1 cylinder head.

E362 Grumman G-164 30 Jul 80 0 S Samson, Al. USA.
AgCat Crankshaft, front counterweight assembly.

Propeller

F198 Grumman G-164 23 May 78 0 S Iowa, La. USA.
AgCat 18 inches missing from blade AG100-2.

Landing Gear

G67 Grumman G-164 8 Jul 64 0 S Port Lavaca, Tex. USA.
AgCat Gear spring leg at axle attach bolt holes.

G170 Grumman G-164 29 Apr 66 O S Abbeville, La. USA.
AgCat Main landing gear.

G188 Grumman G-164 8 Sep 66 0 S McAdoo, Tex. USA.
AgCat Left landing gear at fuselage attach point.

G232 Grumman G-164 8 May 68 0 S Elton, La. USA.
AgCat Left main gear.

G302 Grumman 164A 1971 0 S Dayboro, Qld. Australia.
AgCat Gear collapsed.

G311 Grumman G-164 14 Aug 71 0 S Buttonwillow, Cal. USA.
AgCat Left gear leg.

G312 Grumman G-164 17 Aug 71 0 S Davis, Cal. USA.
AgCat Main landing gear.

G347 Grumman G-164 12 Mar 73 0 S Hockley, Tex. USA.
AgCat Landing gear P/N A-1530-12 broke 18" below attachment.

G383 Grumman G-164 21 Aug 74 0 S Davis, Cal. USA.
AgCat Right gear leg.

G414 Grumman G-164A 23 Dec 75 0 S Zellwood, Fla. USA.
AgCat Main landing gear.

G427 Grumman G-164A 19 Apr 76 0 S Kaplan, La. USA.
AgCat Right gear leg.

G464 Grumman G-164A 13 Jun 78 0 S Pine Prairie, La. USA.
AgCat Landing gear bolts P/N MS20008H22 and P/N AN509616-35.

Miscellaneous

H24 Grumman G-164 1977 0 S Wee Waa NSW, Australia.
AgCat Aircraft ground looped. Left leg detached. Flexible hose from brake master cylinder in perished condition.

GRUMMAN AVENGER

Engine

E131 Grumman TBM-3 Avenger 21 Jun 70 1 D St. Martin, N.B. Canada.
Front bank master rod.

Propeller

F183 Grumman TBM-3E Avenger 9 Jun 77 0 D Blissville, N.B. Canada.
Hamilton-Standard constant-speed propeller blade failure. Corrosion-induced fatigue. Engine separated. 3271 airframe hours.

GRUMMAN GOOSE

Flight Controls

D38 Grumman G-21A Goose 17 Sep 79 1 S Avalon, Calif. USA.
Up elevator cable separated 3 to 4 ft. forward of station 29.

AIRCRAFT TYPE (FIXED-WING)

Engine

E316 Grumman G-21A 2 Sep 78 4 D St. Thomas, Virgin Islands.
 Goose Fatigue fracture, cylinder assembly. Aircraft beyond required inspection time. Total time on engine: 602.3 hours.

Propeller

F13 Grumman G-21A Goose 17 Jul 62 0 S Catalina Is., Cal. USA.
 No. 3 prop blade (blade retention flange radius at blade trailing edge). Cause: vibration from rotation of blade within retention clamp.

GRUMMAN MALLARDHydraulic Line

H4 Grumman G-73 20 Mar 64 0 S Key West Airport, Fla. USA.
 Mallard Main hydraulic pressure line tee fitting.

H5 Grumman G-73 20 Mar 64 0 S West Palm Beach Airport, Fla. USA.
 Mallard Hydraulic line (tool damage)

GRUMMAN OV-1 MOHAWKEngine

E173 Grumman OV-1D Mohawk 12 Aug 72 1 D Vn. USA.
 (US Army) Engine (disc).

GRUMMAN TRACKERLanding Gear

G448 Grumman S2E 29 Aug 77 0 S At sea, HMAS Melbourne.
 Tracker (RAN) Nose wheel trunnion.

GRUMMAN WIDGEONFuselage

C23 Grumman G-44 30 Dec 78 0 S Waitemata, New Zealand.
 Widgeon Section of hull plating immediately forward of the step failed. Fatigue & stress corrosion.

Engine

E78 Grumman G-44 15 Mar 66 0 S Port Alberni, B.C. Canada.
 Widgeon Crankshaft at grinding crack in cheek of fillet of no. 4 bearing journal.

Landing Gear

G459 Grumman G-44 14 Feb 78 0 S Pilot Point, Ak. USA.
 Widgeon Right main gear retract strut.

HAL PUSHPAKWing

A80 HAL Pushpak Sep 67 ? D Jaipur, India.
 Wing failure. Lift strut lower-rear attach lug.

HALL CHEROKEE II (SAILPLANE)Wing

A135 Hall Cherokee II 2 May 81 1 D Valyermo, Ca. USA.
 (sailplane) Glider pitched up, breaking tow rope. Wings separated. Pre-existing cracks in wood spars.

HANDLEY PAGE W.10

Tail

B2 Handley Page 22 Sep 34 4 D Aston Clinton, England.
W.10 Fracture of main bolt securing the bracing wire to front spar of tailplane, allowing tailplane to twist. 5000 airframe hours. Bolts made from mild steel and improperly marked as high-tensile steel.

Engine

E1 Handley Page 17 Jun 29 7 D English Channel near Dungeness, England.
W.10 Steel studs in front big-end bearing of starboard engine.

HANDLEY PAGE H.P.50 HEYFORD

Landing Gear

G1 Handley Page 10 Jun 32 ? ? Upper Heyford, UK.
H.P. 50 Starboard outer end of lower centre-section
Heyford Mk. 1 front spar failed (fatigue), causing undercarriage to collapse.
(RAF)

HANDLEY PAGE H.P.67 HASTINGS

Flight Controls
B8 Handley Page Jan 53 ? ? Fayid, Egypt.
Hastings C.1 (RAF) Elevator outer hinge-bolts.

B13 Handley Page 6 Jul 65 41 D Dorchester, England.
Hastings Upper two attachment bolts of starboard
(RAF) elevator outrigger.

HANDLEY PAGE H.P.80 VICTOR

Tail
B9 Handley Page 14 Jul 54 4 D Cranfield, UK.
H.P.80 Victor Tailplane separated. Cracks around bolt holes in prototype fin allowed 3 bolts securing tailplane to loosen and shear.

HANDLEY PAGE H.P.81 HERMES

Engine
E8 Handley Page 23 Jul 52 0 D Pithiviers, France.
Hermes IV Crankshaft web.

E9 Handley Page 25 Aug 52 7 D Trapani, Sicily.
Hermes IV Crankshaft web.

HANDLEY PAGE H.P.R.7 HERALD

Landing Gear
G357 Handley Page 4 Sep 73 0 S Gatwick, UK.
Herald Front pressure bulkhead around nose gear down-lock failed, allowing downlock catch to spring out.

G405 Handley Page 28 Aug 75 0 S Tel Aviv, Israel.
Herald Right main gear actuating hydraulic cylinder.

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AIRCRAFT TYPE (FIXED-WING)

HANDLEY PAGE H.P.137 JETSTREAM

Engine

E123 Handley Page 6 Mar 70 11 D Samedan, Switzerland.
Jetstream 1st stage turbine disc of left engine (Turbo-meca Astanou XVI). Material: Udiment 500.

HAWKER TYPHOON

Tail

B3 Hawker Typhoon WW II 1 D UK?
(RAF) Tail failure. Origin: rivet hole. Possibly several additional accidents.

HAWKER SIDDELEY ARGOSY (See Armstrong Whitworth Argosy)

HAWKER SIDDELEY HARRIER

Flight Controls

D23 Hawker 23 Jan 74 1 D Wildenrath, West Germany.
Siddley Harrier Starboard flap mechanical drive system.
GR.3 (RAF)

D45 Hawker 14 Oct 80 1 D Gutersloh, W. Germany.
Siddley Failure of roll reaction control rod from
Harrier GR.3 starboard aileron to roll reaction shutter.
(RAF)

Engine

E370 H.S. Harrier 28 Oct 80 0 D Kaleborn, W. Germany.
GR.3 (RAF) FOD damage to fan, fatigue cracks propagated from impact mark, h.p. compressor blade failed.

HAWKER SIDDELEY HS 748

Wing

A117 Hawker 14 Apr 76 34 D Cutral-Co, Argentina.
Siddley Separation of right wing. Crack origin at rivet
HS 748 holes of reinforcing plate by external rib of
engine. Matl: BS L72. Airframe hours: 25,760.

Engine

E225 Hawker 3 Feb 75 33 D Manila, Philippines.
Siddley 3 bridges in the flame tube of no. 5 combustion
HS 748 chamber failed, causing fire.

HELIO H-250 COURIER II

Landing Gear

G510 Helio H-250 8 Aug 80 0 S Keith Bay, NWT. Canada.
Courier II Wheel axle.

HELIO H-295/H-395 SUPER COURIER

Wing

A100 Helio H-295 21 Aug 71 3 D Sitka, Alaska, USA.
Super Courier Separation of left wing. Lower attachment
fitting P/N 391-030-4072

A122 Helio H-295 15 Aug 78 4 D Amai Inlet, BC, Canada.
 Super Courier Separation of wing. Lower left carry-through fitting in bottom portion of lug at wing-attachment bolt hole. Origin: corrosion pitting in bolt hole bore. Aircraft damaged in prior accident. 1178 airframe hours.

Engine
 E17 Helio H-395 16 Sep 59 0 S McMurray, Alta. Canada.
 Super Courier Connecting rod bearing cap retaining bolt, P/N 60007.

E96 Helio 395A 30 Jul 67 0 ? Cullaton Lake, NWT. Canada.
 Super Courier No. 4 cylinder exhaust valve.

HELIO 391 COURIER

Engine
 E20 Helio H-391B 19 May 60 0 S Watson Lake, Y.T. Canada.
 Courier Movement between stationary gear plate and reduction gear housing permitted severe engine vibration and fatigue failure of bolts.

Landing Gear
 G180 Helio H-391B 2 Aug 66 0 S Van Nuys, Cal. USA.
 Courier Right strut failed. Flown extensively from rough fields.

HIRTH ACROSTAR

Control System
 D24 Hirth 4 Jul 74 1 D Straubing-Wallm. West Germany.
 Acrostar Mk 2 Failure of control system. Unapproved modification.

D48 Hirth 19 Sep 82 0 D Pau, France.
 Acrostar Tube in which (elevator) stick is mounted was broken on one side.

HOWARD DGA-15

Landing Gear
 G79 Howard 20 Sep 64 0 D Deridder, La. USA.
 DGA-15P Left gear attach fitting, main gear.

G538 Howard 26 Oct 81 0 S Dryden, Ont. Canada.
 DGA-15 Nightingale Left main gear upper strut.

ILYUSHIN II-62

Engine
 E353 Ilyushin 14 Mar 80 87 D Warsaw, Poland.
 IL-62 Failure of shaft of no. 2 engine, damaging 2 other engines & control system for tail surfaces.

INTERMOUNT A9A

Landing Gear
 G337 Intermount 1973 0 S Bridgetown WA, Australia.
 A9A Bottom shock strut terminal, port gear.

INTERSTATE S1B1

Landing Gear
 G424 Interstate 26 Feb 76 0 S Wasilla, Alas. USA.
 S1B1 Landing gear failed. Rust found along break.

JODEL (See S.A.N. Jodel)JUNKERS F.13

Tail
 B1 Junkers F.13 21 Jul 30 6 D Meopham, Kent UK.
 Breakage of tailplane from severe buffeting from air eddies produced by the wing.

JUNKERS JU 52

Wing
 A24 Junkers Ju 52 WW II ? D S. America.
 1943? Wing failure. Spar at a riveted construction in the tension chord.

LAKE LA-4

Oil Line
 H13 Lake LA-4 16 Sep 67 0 S Flesherton, Ont. Canada.
 Propeller governor oil line tube (fretting) caused engine oil starvation.

LATECOERE 631

Flight Controls
 D1 Latecoere 28 Mar 50 12 D Cape Ferrett, France.
 631 Aileron control couplings, port wing.

LET L-13 BLANIK (SAILPLANE)

Wing
 A123 Let L-13 19 Nov 78 0 D Kamp-Lintfort, W. Germany.
 Blanik sailplane Spar failure, left wing, during looping. Fatigue probably because of earlier over-stress.
 Occupants parachuted.

LOCKHEED CONSTELLATION/SUPER CONSTELLATION

Fuselage
 C9 Lockheed Constellation 1958 0 S ?
 Aft pressure bulkhead. Crack propagated completely around circumference of bulkhead.
 Origin: corrosion in toilet area. 37,000 hours.

Engine
 E4 Lockheed 049 18 Jun 47 14 D Mayadine, Syria.
 Constellation No. 18 exhaust rocker arm of no. 1 engine.

Propeller
 F3 Lockheed L-049 18 Nov 47 5 D New Castle, Delaware USA.
 Constellation Propeller blade.

F4 Lockheed L-649 7 Feb 48 1 S Bunnell, Fla. USA.
 Constellation Propeller blade.

F8	Lockheed L-749A Constellation	3 Aug 53	4	D Fethiye, Turkey. Propeller blade.
<u>Landing Gear</u>				
G8	Lockheed L-749 Constellation	18 Dec 58	0	S Atlanta, Ga. USA. Lower drag strut terminal for P/N 299284 of right main gear.
G9	Lockheed L-1049	17 Jan 59	0	S Olathe, Kan. USA. Landing gear down-lock strut.
G19	Lockheed L-749	3 Jan 60	0	S Philadelphia Pa. USA. Right gear strut cylinder.
G20	Lockheed L-749	4 Jan 60	0	S Washington, D.C. USA. Right gear strut cylinder.
G22	Lockheed L-1049G	29 Feb 60	0	S Chicago, Ill. USA. Drag strut of right main gear.
G32	Lockheed L-1049G Super Constellation	3 Aug 61	0	D New York, N.Y. USA. Upper cap weld of right landing gear shock strut cylinder.
G37	Lockheed L-1049	28 May 62	0	S New York, USA. Bolt attaching nose gear to drag strut.
G49	Lockheed 749 Constellation	9 Mar 64	0	S Boston, Mass. USA. Stress corrosion and fatigue failure of nose gear actuating strut piston rod end clevis.
G76	Lockheed L-749	9 Sep 64	0	S Boston, Mass. USA. Nose gear actuating strut.

LOCKHEED ELECTRA

<u>Fuselage</u>				
C25	Lockheed L-188 Electra	18 Jan 80	0	S Syracuse, N.Y. USA. Forward cargo door, door latch loop (fastener holes). 34,794 airframe hours, 16,469 landings.
<u>Propeller</u>				
F25	Lockheed L-188 Electra	15 Feb 65	0	S Okarche, Okla. USA. Propeller, manufacturer defect.
<u>Landing Gear</u>				
G178	Lockheed L-188A Electra	21 Jul 66	0	S Fort Worth, Tex. USA. Left main gear door actuating piston.

LOCKHEED C-5A GALAXY

<u>Engine</u>				
E406	Lockheed C-5A Galaxy (USAF)	May-Oct 82	? ?	USA? Cracking in compressor rear frames, GE TF39-1C engine. Fire caused \$400,000 damage.
E407	Lockheed C-5A Galaxy (USAF)	May-Oct 82	? ?	USA? Cracking in compressor rear frames, GE TF39-1C engine. Fire caused \$1,200,000 damage.

I-70

AIRCRAFT TYPE (FIXED-WING)

Pylon

H19 Lockheed 29 Sep 71 0 S Altus AFB, Okla., USA.
C-5A Galaxy
(USAF) Engine pylon fatigue failure during ground runup.
Outboard truss member in aft pylon mount. 1275
airframe hours, 3100 landings.

LOCKHEED HERCULES

Wing

A112 Lockheed 23 May 74 4 D Springfield, Ill. USA.
382E Hercules Separation of port wing. Outer WS 162, lower
front spar cap. Origin: first fastener hole.
Material: 7075-T6511. Airframe hours: 18,837.

A114 Lockheed 30 Oct 74 4 D Bettles, Alaska, USA.
382B Hercules Separation of right wing. Fastener holes in
lower hat section, skin panels, no. 3 engine
compressor diffuser case, centre WS 183.

Fuselage

C18 Lockheed 15 Apr 66 0 D Borden, Sask. Canada.
C-130 Explosive decompression of fuselage. Forward
Hercules cargo door missing. Failure of #1 eye bolt.
(Canadian Forces) Origin: stress concentration (poor machining).

Landing Gear

G349 Lockheed 17 Mar 73 0 S Pensacola, Fla. USA.
382G Hercules Nose gear cylinder. Origin: stress-corrosion
pits.

LOCKHEED 18 LODESTAR

Engine

E115 Lockheed 17 Apr 69 0 S Port Hardy, B.C. Canada.
18-56 Lodestar Piston link rod, left engine.

LOCKHEED T-33/TV-2 SILVER STAR

Wing

A49 Lockheed/ 29 May 57 1 D Zweibrucken, Germany.
Canadair T-33 Port wing failed from crack in spar cap (lower
Silver Star front) near attachment fitting.
(Canadian Forces)

Fuselage

C1 Lockheed T-33 1953-59 ? ? ?
Silver Star (USAF) Fuselage failure.

Engine

E140 Lockheed 4 Dec 70 0 D Cheyenne, Wyo. USA.
TV-2 Fatigue fracture, turbine assembly retention,
blade.

LOCKHEED F-104 STARFIGHTER

Wing

A89 Lockheed pre-Dec/69 1 D Luke AFB, USA.
F-104G Separation of right wing. Lower skin access
(German AF) cutout, WS 80.7.

A97	Lockheed	25 Mar 71	0	D	Cold Lake, Alta. Canada. CF-104 Starfighter (Canadian Forces) Wing failure (lower skin). Skin had wrong grain direction.
D44	<u>Leading Edge Flap</u> Lockheed	27 Aug 80	0	D	Terschelling Is., Netherlands. CF-104 Starfighter (Canadian Forces) Left leading-edge flap separated. Failure of forward beam hinge lobes.
E56	<u>Engine</u> Lockheed	5 Jul 65	0	D	Zweibrucken, Germany. CF-104 Starfighter (Canadian Forces) Main fuel pump drive splines (lack of lubrication).

LOCKHEED L-1011 TRISTAR

G516	<u>Wheel</u> Lockheed	23 Dec 80	2	S	Qatar. L1011 TriStar Main landing gear, inboard wheel flange failed, resulting in explosive decompression of cabin.
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LTV A-7 CORSAIR II (See Vought Corsair II)

LUSCOMBE 8

B35	<u>Tail</u> Luscombe 8A	28 Oct 79	0	D	Fredericksburg, Texas USA. Vertical stabilizer & rudder separated (attachment failure).
D8	<u>Flight Controls</u> Luscombe 8A	16 Jan 65	0	S	Colliston, Utah. USA. Left rudder cable.
E48	<u>Engine</u> Luscombe 8C	18 Apr 65	0	D	Laguna Beach, Calif. USA. Engine crankshaft.
E81	Luscombe 8E	15 May 66	0	S	Eau Gallie, Fla. USA. Crankshaft cluster gear attaching screws.
E92	Luscombe 8E	23 Apr 67	0	D	Laguna Beach, Calif. USA. Camshaft rear bearing journal in area of flange fillet.
G179	<u>Landing Gear</u> Luscombe 8A	22 Jul 66	0	S	Titusville, Fla. USA. Left landing gear drag brace bolt.
G236	Luscombe 8A	13 Jul 68	0	S	Longwood, Fla. USA. Left gear jack strut attach bolt.
G361	Luscombe 8A	4 Nov 73	0	S	Denton, Tex. USA. Front left landing gear attachment.
G411	Luscombe 8A	18 Oct 75	0	S	Willow, Ark. USA. Right float attach fitting.
G443	Luscombe 8C	27 Mar 77	0	S	Pittsfield, Ma. USA. Landing gear struts.

I-72

AIRCRAFT TYPE (FIXED-WING)

G449 Luscombe 8E 3 Sep 77 0 S Mormon Lake, Ariz. USA.
Main landing gear.

MARTIN 2-0-2

Wing
A28 Martin 2-0-2 29 Aug 48 37 D Winona, Minn., USA.
Outer panel, left wing separated. Lower front
wing root fitting. Material: 75ST. Airframe
hours: 1542.

MARTIN 4-0-4

Landing Gear
G21 Martin 4-0-4 28 Feb 60 0 S Olathe Kan. USA.
Left main gear gland nut.

MARTIN B-57

C3 Martin B-57 1953-59 ? ? ?
(USAF) Fuselage failure.

MAULE M-4 ROCKET

Tail
B30 Maule M-4-210C 30 Apr 78 1 S Bethel, Alaska USA.
Left horizontal stabilizer.

Landing Gear
G116 Maule M-4 3 Jul 65 0 S Moorpark, Cal. USA.
Right center shock strut.

G123 Maule M-4 21 Aug 65 0 S Columbus, Ohio. USA.
Right landing gear shock strut.

G359 Maule M-4-220C 23 Sep 73 0 S Bethel, Alas. USA.
Main gear.

G372 Maule M-4-210C 14 Apr 74 0 S Aalen-Heidenheim, W. Germany.
Tail landing gear.

MAULE M-5 LUNAR ROCKET

Flight Controls
D46 Maule M-5 1981 0 S Bankstown NSW, Australia.
Right rudder-pedal torque tube (weld).

MBB BO 209 MONSUN

Landing Gear
G385 MBB BO 209 Monsun 5 Oct 74 0 S Koenigsdorf, W. Germany.
Nose gear strut attachment.

MCDONNELL F-101 VOODOO

Engine
E143 McDonnell CF-101 Voodoo 18 Feb 71 0 D Comox. B.C. Canada.
(Canadian Forces) Starboard J57 engine compressor blade. Origin:
platform area.

E230 McDonnell 14 May 75 0 D Bagotville, Que. Canada.
 CF-101 Voodoo
 (Canadian Forces) Starboard engine caught fire during afterburner.
 Crack adjacent to axial weld of engine casing.

MCDONNELL DOUGLAS DC-8

Flap
 D41 McDonnell 13 Jan 80 0 S Gander, Nfld., Canada.
 Douglas Left flap support fitting at station XF219.498
 DC-8-61 fractured, and 2 flap hinge base fittings at
 station XW97.906 fractured.

Engine
 E121 Douglas 28 Nov 69 0 S Newark, N.J. USA.
 DC-8 12th stage compressor disc, no. 4 engine.

E125 McDonnell 19 Apr 70 0 D Rome, Italy.
 Douglas Hub 1st stage fans of no. 1 engine. Ejected metal
 DC-8-60 parts damaged pylon of no. 2 engine, and started
 fire.

Landing Gear
 G95 Douglas DC-8 8 Jan 65 0 S San Juan, Puerto Rico.
 Right main landing gear axle beam. Service
 hours: 8943. P/N 5819123-4.

G260 Douglas DC-8 17 Sep 69 0 S Dallas, Tex. USA.
 Landing gear lower lug of forward bogie beam.

G450 Douglas 2 Oct 77 0 S Shannon Airport, Limerick, Ireland.
 DC-8-61 Inboard half of #3 wheel rim.

G517 Douglas DC-8 29 Dec 80 0 S Phoenix, Az. USA.
 Stress corrosion fatigue failure of right main
 gear bogie beam P/N 5774700-500.

MCDONNELL DOUGLAS DC-9

Fuselage
 C24 Douglas 17 Sep 79 0 S Between Boston USA & Yarmouth NS, Canada.
 DC-9-32 Fatigue fracture of aft cabin pressure bulkhead
 (explosive decompression). Origin: rivet hole
 below aft bulkhead access door. Crack missed in
 prior inspections. 28,425 airframe hrs, 26,816
 landings. Matl: Alclad 2014-T6.

Engine
 E165 Douglas DC-9 19 Mar 72 0 S Atlanta, Ga. USA.
 Second stage compressor disc (# 2 engine).
 Separated at rear fan case.

MCDONNELL DOUGLAS DC-10

Pylon
 H33 McDonnell 25 May 79 273 D Chicago, Ill. USA
 Douglas DC-10 Pylon failed & engine separated. Crack caused by
 faulty maintenance and propagated by fatigue.
 Airframe hours: 19,871.

I-74
AIRCRAFT TYPE (FIXED-WING)

MCDONNELL DOUGLAS F-4 PHANTOM II

<u>Wing</u>						
A90	McDonnell F-4 Phantom II (USAF)	16 Dec 69	0	S USA?		Failure of left outer wing. Knife-edge fastener holes in lower torque-box skin, outboard lower wing. Aircraft recovered safely. 1700 airframe hours.
A93	McDonnell F-4 Phantom II (USAF)	26 Feb 70	0	S USA?		Failure of left outer wing. Knife-edge fastener holes in lower torque-box skin, outboard lower wing. Aircraft recovered safely. 1259 airframe hours.
A94	McDonnell F-4 Phantom II (USAF)	18 Mar 70	0	S USA?		Failure of right outer wing. Knife-edge fastener holes in lower torque-box skin, outboard lower wing. Aircraft recovered safely. 464 airframe hours.
A105	McDonnell F-4 Phantom II (USAF)	Jan 73	?	D Nellis AFB, USA		Port wing failure, lower lock lug.
A118	McDonnell Douglas F-4M Phantom II (RAF)	23 Jul 76	0	D Coningsby, UK.		Wing failure. Outer wing fold lug, aft lock lug. Loads caused by buffeting.
<u>Tail</u>						
B19	McDonnell Douglas F-4 Phantom II (USAF)	pre-1972	0	S ?		Outer portion of stabilator separated at SS 51.85 splice rib. Origin: aft edge of Al skin. 500 airframe hours. Aircraft recovered safely.
B20	McDonnell Douglas F-4 Phantom II (USAF)	pre-1972	0	S ?		Outer portion of stabilator separated at SS 51.85 splice rib. Origin: aft edge of Al skin. Aircraft recovered safely.
B21	McDonnell Douglas F-4 Phantom II (USAF)	pre-1972	0	S ?		Outer portion of stabilator separated at SS 51.85 splice rib. Origin: aft edge of Al skin. 1540 airframe hours. Aircraft recovered safely.

MCDONNELL DOUGLAS F-18 HORNET

<u>Engine</u>						
E367	McDonnell Douglas TF/A-18 Hornet (US Navy)	8 Sep 80	0	D Middle Wallop, England.		Low-pressure turbine disk of right GE F404 engine. Crack began at large undetected flaw. Material: Rene 95.

MEYERS 200 (See Aero Commander 200)

MEYERS MAC 145

H6 Brake System Meyers 2 May 64 0 S Chicago, Ill. USA.
MAC 145 Right brake master cylinder actuating rod.

MIDGET MUSTANG (See Bushby/Long Midget Mustang)

MILES M.65 GEMINI

E15 Engine Miles 4 Mar 59 1 D Panshanger Aerodrome, Hertford U.K.
M.65 Gemini Crankshaft of starboard engine.

MITSUBISHI MU-2

F225 Propeller Mitsubishi 30 Nov 80 0 D Port Aransas, Tex. USA.
MU-2J Prop blade. Origin: stress corrosion crack.

MOONEY M-18

A72 Wing Mooney M-18C 31 Mar 64 1 D Roanoke Rapids, N.C. USA.
Wing failure (spar).

G101 Landing Gear Mooney M-18L 30 Jan 65 0 S Pacoima, Cal. USA.
Right main gear operating arm (weld).

MOONEY M-20

E119 Engine Mooney M20C 23 Jun 69 1 D Banff, Alta. Canada.
Engine failure, fatigue of rigid oil-pressure line, propeller governer to crankcase.

E336 Mooney M-20E 4 Jun 79 0 S Idar-Oberstein, W. Germany.
Stud of #3 cylinder.

E384 Mooney M-20G 21 Mar 81 2 D Ryegate, Mt. USA.
Mufflers, poor weld, corrosion and fatigue fracture.

E387 Mooney M-20K 3 May 81 0 S Churchville, Md. USA.
No. 5 piston. Internal voids found near hole in sidewall.

E394 Mooney M-20K 25 Jul 81 0 S Defuniak Springs, Fl. USA.
No. 2 conrod.

E395 Mooney M-20F 30 Jul 81 0 S Licking, Mo. USA.
Crankcase.

F26 Propeller Mooney M-20E 16 Feb 65 0 S Woodward, Okla. USA.
Propeller blade (sharp nick).

F34 Mooney M-20B 6 Feb 66 0 S Bellview, N.Mex. USA.
Propeller blade broke 15" from tip.

F47 Mooney M-20E 6 Mar 67 0 S Pendleton, Ore. USA.
6" of propeller blade separated.

F48 Mooney M-20C 12 Mar 67 0 S Mangum, Okla. USA.
Propeller hub.

F51 Mooney M-20D 8 Apr 67 0 S Erie, Colo. USA.
Propeller hub.

F52 Mooney M-20E 15 May 67 0 S Dighton, Kans. USA.
Prop blade (4 1/2" from tip).

F62 Mooney M-20E 29 Oct 67 0 S Fort McCoy, Fla. USA.
Propeller blade (origin: corrosion pit).

F69 Mooney M-20C 24 Apr 68 0 D Hillsboro, Kansas USA.
18 in. of propeller blade separated.

F72 Mooney M-20E 28 Jul 68 0 S Jackson, La. USA.
Propeller blade across shank.

F83 Mooney M-20B 16 Aug 69 0 D Quitman, Ark. USA.
Propeller blade.

F90 Mooney M-20E 3 Oct 70 0 S Enterprise, Kans. USA.
Blade failed 3" outboard of hub flange.

F91 Mooney M-20E 26 Oct 70 0 S Chugwater, Wy. USA.
Propeller blade, 3" from hub.

F128 Mooney M-20A 12 Nov 73 1 D Innisfree, Alta. Canada.
Propeller.

F133 Mooney M-20E 20 Jul 74 2 D Custer, S. Dakota USA.
Propeller blade at shot-peened area.

F138 Mooney M-20C 25 Aug 74 0 S Stanfield, Ariz. USA.
Propeller blade. Prior damage dressed out.

F162 Mooney M-20C 24 Jan 76 0 S Fontana, Cal. USA.
Propeller hub (blade socket retention threads).

F200 Mooney M-20C 6 Jun 78 0 S Bennett, Col. USA.
Propeller at indentation on edge of blade.

F223 Mooney M-20C 16 Oct 80 0 S Willcox, Az. USA.
21" of blade shed (possible high stress from
blade straightening).

G63 Landing Gear Mooney M-20 12 Jun 64 0 S Bucklin, Kans. USA.
Landing gear handle.

G129 Mooney M-20A 23 Sep 65 0 S West Carrollton, Ohio. USA.
Tubular spacer between nose gear actuator rod
bellcrank and gear retraction rod bellcrank.

G138 Mooney M-20E 1 Nov 65 0 S Shreveport, La. USA.
Nose gear shock absorber.

G145 Mooney M-20C 28 Nov 65 0 S Denver, Colo. USA.
Nose gear retract truss assembly.

G153 Mooney M-20A 2 Jan 66 0 S Goodland, Kans. USA.
Weld on spacers of clevis fittings on lateral torque rod failed.

G166 Mooney M-20 16 Apr 66 0 S Kingman, Kans. USA.
Nose gear struts (welds).

G203 Mooney M-20 21 Mar 67 0 S Minden, Nev. USA.
Landing gear lever bell cranks in attach welds.

G528 Mooney M-20F Executive 21 2 May 81 0 S Hamilton, Ont. Canada.
Nose gear steering shaft.

MOONEY M-21

Propeller
F18 Mooney Mk21 7 Jul 64 0 S Mansfield, Mo. USA.
Propeller blade.

F19 Mooney M-21 6 Sep 64 0 S Calpine, Cal. USA.
Propeller blade.

Landing Gear
G303 Mooney M-21 14 Feb 71 0 S North Shore, Cal. USA.
Actuating lever (weld) P/N 5059.

MOROVAN ZLIN 326/Z526

Wing
A96 Zlin Z526A 3 Jun 70 0 D UK.
Failure of centre-section, lower spar boom,
left wing inboard of undercarriage leg.
Aircraft crash-landed successfully. Airframe
hours: 453, mainly in aerobatics.

Engine
E292 Moravan Z526 2 Sep 77 0 S Schmidgaden, W. Germany.
Intake valve, #2 cylinder.

Miscellaneous
H3 Zlin 326 1 May 63 1 D Oulu Airport, Finland.
During towing, sailplane's cylinder cap broke
and pilot interrupted towing. While turning
back to airport, aircraft crashed.

MORRISEY 2150 (See Varga 2150 Kachina)

MUSTANG L-2

Propeller
F103 Mustang L-2 12 Sep 71 1 S Indio, Calif. USA
Propeller unapproved for engine installation,
blade separated.

NAVION

Engine
E41 Navion B 27 Jan 65 0 S Flushing, N.Y. USA.
No. 4 bearing cap bolt.

I-78
AIRCRAFT TYPE (FIXED-WING)

E43	Navion B	7 Mar 65	0	S Englewood, Fla. USA. Heater muffler at exhaust stack attachment.
E46	Navion A	1 Apr 65	0	D Coon Rapids, Minn. USA. No. 1 piston.
E88	Navion A	8 Sep 66	0	S Phillipstown, N.Y. USA. Crankshaft accessory drive gear dowel pin and attach screws failed.
E95	Navion B	18 Jun 67	0	S Stoney Plain, Alta. Canada. Studs attaching stationary gear drive plate to interior of reduction gear housing.
<u>Landing Gear</u>				
G66	Navion G	1 Jul 64	0	S Des Moines, Iowa. USA. Nose wheel steering torque tube.
G183	Navion B	12 Aug 66	0	S Bakersfield, Cal. USA. Nose gear trunnion unit (weld).

NOORDUYN NORSEMAN

<u>Wing</u>				
A56	Noorduyn Norsemann V	15 Sep 58	1	D Nanika, Ont. Canada. Wing failure. Rear front eyebolt, attaching diagonal wing strut to front spar of right wing
A67	Noorduyn Norsemann V seaplane	22 Jan 63	1	D Pickle Lake, Ont. Canada. Left wing failure. Upper forward strut eyebolt.
<u>Landing Gear</u>				
G34	Norseman IV	28 Feb 62	0	S Mellersh Pt., B.C. Canada. Fitting socket of right float strut attachment.
G105	Norseman V	26 Feb 65	0	S Big Trout Lake, Ont. Canada. Left gear axle housing at lower end of shock strut.
G168	Norseman 6	23 Apr 66	0	S Bowden Lake, Man. Canada. Right gear shock strut stub leg (cracks in weld repair).

NORTH AMERICAN AT-6 TEXAN/HARVARD

<u>Flight Controls</u>				
D10	N. American SNJ-5 Texan	14 Aug 65	0	S Monroeville, Pa. USA. Left rudder cable.
<u>Engine</u>				
E152	North American AT-6G	27 Sep 71	2	D Davis Creek, Calif. USA. Fracture in heater shroud allowed engine exhaust to enter cockpit.

NORTH AMERICAN B-24 LIBERATOR

G4 Landing Gear
N. American 1944 ? ? ?
B-24 Liberator (USAAC) Nose gear failure.

NORTH AMERICAN P-51 MUSTANG

A41 Wing
N. American 1953-59 ? ? ?
F-51 Mustang (USAF) Wing failure.

B6 Tail
N. American 1953-59 ? ? ?
F-51 Mustang (USAF) Tail failure.

E301 Engine
N. American 15 Feb 78 0 S Ellisville, Ms. USA.
P-51 Mustang Crankshaft at no. 4 webbing.

G139 Landing Gear
N. American 4 Nov 65 0 S Santa Monica, Cal. USA.
P-51D Mustang Tailwheel turnbuckle shaft.

H1 Engine Mounts
N. American Mar 44 1 D Boxted, Essex. UK.
P-51 Mustang Engine mounting bolts. Engine separated.
(USAF) (Faulty heat treatment).

NORTH AMERICAN F-86 SABRE (FJ FURY)

A44 Wing
N. American Nov 54 ? D Nellis Air Force Base, Nevada USA.
F-86F Sabre Wing failure at under-wing aluminum attach bars
(USAF)

A45 N. American Nov 54 ? D Nellis Air Force Base, Nevada USA.
F-86H Sabre Wing failure at under-wing aluminum attach bars
(USAF)

A46 N. American 1955-59 1 D ?
FJ-4 Fury Wing failure (bolt holes). Role changed from
(US Navy) fighter to fighter-bomber.

C5 Fuselage
N. American 1953-59 ? ? ?
F-86 Sabre (USAF) Fuselage failure.

H15 Miscellaneous
N. American 3 Jan 68 1 ? Ubon, Thailand.
F-86 Sabre Bolt in engine intake fatigued. Bolt head
(RAAF) ingested by engine, causing aircraft to stall
on final approach.

I-80

AIRCRAFT TYPE (FIXED-WING)

NORTH AMERICAN F-100 SUPER SABRE

- A84 Wing
N. American 1967 or 68 1? D Nellis AFB, USA.
F-100 Wing failure at Wing Canted Station 102, lower
Super Sabre skin 51% spar bolt holes. Matl: 7075-T651. 2140
(USAF) airframe hours.
- A86 N. American 21 Oct 68 0 D Laughlin AFB, Del Rio, Texas USA.
F-100D Wing failure at Wing Centre Section, lower-
Super Sabre cover outer-skin bolt hole. Matl: 7075-T6.
(USAF) 2890 airframe hr. Role: Thunderbirds demo team.

NORTH AMERICAN SABRELINER

- G334 Landing Gear
N. American 28 Aug 72 0 S Columbia, Mo. USA.
Sabreliner 40 Right gear outer cylinder.

NORTH AMERICAN ROCKWELL COMMANDER (See Aero Commander)

NORTHRUP F-5

- A95 Wing
Northrup 20 Apr 70 1 D Williams AFB, USA.
F-5A Wing separation. Centre wing lower skin. Tool
(USAF) damage caused initial crack.
- E260 Engine
Northrup 2 May 76 0 D Winnipeg, Man. Canada.
CF-5 #1 afterburner spray bar cracked. Torching
(Canadian Forces) burned through heat shield causing fire.

NORTHRUP F-89 SCORPION

- A36 Wing
Northrup 1952 ? D ?
F-89C Scorpion Wing failure, wing-fuselage fitting.
- A37 Northrup Sep 52 2 D Detroit, USA.
F-89 Scorpion Right wing failure, wing-fuselage fitting.

OWL RACER

- F97 Propeller
Owl 31 May 71 1 D Greenwich Reach, England.
Racer Half a prop blade shed, tearing out engine.
Origin: corrosion pit.

PIAGGIO P.149

- E228 Engine
Piaggio 13 Apr 75 0 S Neuenwalde, W. Germany.
P.149-D1 Crankshaft. Vibration due to wear of bearings.

PIAGGIO P.166

- E275 Engine
Piaggio 1977 1 ? Australia.
P.166 Engine connecting rod.

PIETENPOL AIRCAMPER

D37 Flight Controls
 Pietenpol B4 8 Jul 79 1 D Mesa, Arizona USA.
 Aircamper Elevator push-pull bell-crank mounting steel tube.

PIPER J-3 CUB

A26 Wing
 Piper Cub 26 May 47 2 D Ft. Lauderdale, Fla. USA.
 J-3 Wing failure at shoulder machined on threaded insert, inner end of left front, lower lift-strut fitting.

A126 Piper J-3C 27 Aug 79 0 D Auburndale, Florida USA.
 Right wing failed. Rear inboard strut clevis.

E73 Engine
 Piper J-3C 25 Jan 66 0 S Chesapeake, Va. USA.
 No. 2 cylinder exhaust valve.

F92 Propeller
 Piper J-3 6 Feb 71 0 S Portage La Prairie, Man. Canada.
 Propeller.

G136 Landing Gear
 Piper J-3C 24 Oct 65 0 S Lake Thonotosas, Fla. USA.
 Right float (vertical strut ball fitting).

G164 Piper J-3C 2 Apr 66 0 S Vicksburg, Miss. USA.
 Right main gear strut.

G506 Piper J-3 13 Jun 80 0 S Celt Lake, Ont. Canada.
 Cub Left float attachment at necked portion of bolt attachment at strut end. 1646 airframe hrs

H7 Rudder Pedal
 Piper J-3C 4 Jul 64 0 D Houston, Texas USA.
 Right brake pedal attaching lugs.

PIPER J-4 CUB COUPE

A101 Wing
 Piper J-4A 4 Dec 71 0 D Boise, Idaho USA.
 Failure of left wing. Lift strut, fuselage attach clevis broke. Previous landing incident.

E103 Engine
 Piper J-4 5 May 68 0 S Berlin, N.J. USA.
 Crankshaft failed in keyway.

PIPER PA-12 SUPER CRUISER

B32 Tail
 Piper PA-12 4 May 78 0 S Rheine-Eschendorf, W. Germany.
 Super Cruiser Horizontal stabilizer, front spar attachment.

G426 Landing Gear
 Piper PA-12 18 Mar 76 0 S Elliot Lake, Ont. Canada.
 Super Cruiser Shock cord attachment bolt (left ski).

G430 Piper PA-12 5 Jun 76 0 S Arthur, Ont. Canada.
 Super Cruiser Left undercarriage (fatigue and corrosion)

PIPER PA-16 CLIPPER

G68 Landing Gear Piper PA-16 17 Jul 64 0 S Clear, Alas. USA.
 Clipper Left front landing gear attach fitting.

PIPER PA-18 SUPER CUB

A77 Wing Piper PA-18 11 Jun 66 1 D Moose Jaw, Sask. Canada.
 Super Cub Right wing failure (rear strut fork end). Problem brought about by repeated heavy loadings imposed by crop spraying and rough field operations.

D6 Flight Controls Piper PA-18 31 Jan 64 0 S Lewiston, Id. USA.
 Super Cub Rudder cable attachment fitting lug.

E49 Engine Piper PA-18 24 Apr 65 1 D Dell, Montana USA.
 Super Cub Fracture in muffler obstructed exhaust gas flow. Back-pressure caused power failure.

E137 Piper PA-18 3 Oct 70 0 S Loxley, Ala. USA.
 Super Cub Carburetor cracked around back side of throat.

E339 Piper PA 18-150 23 Aug 79 0 S Schwatka Lake, Y.T. Canada.
 Super Cub Rear section of valve in carb heat box. Avco Lycoming O-320 engine.

E365 Piper PA-18 22 Aug 80 1 S Exeter, R.I. USA.
 Super Cub No. 3 exhaust valve failed. Annual inspection overdue.

F148 Propeller Piper PA-18 31 May 75 0 S Carp, Ont. Canada.
 Super Cub Propeller blade tip shed (nick or pit on leading edge).

F205 Piper PA-18A 7 Dec 78 0 S Cooper Landing, Ak. USA.
 Super Cub Propeller blade.

G169 Landing Gear Piper PA-18 23 Apr 66 0 S Tyonek, Alas. USA.
 Super Cub Landing gear: ski assembly.

G182 Piper PA-18 4 Aug 66 0 S Gakona, Alas. USA.
 Super Cub Left axle shaft separated. Flown extensively from rough strips.

G315 Piper PA-18 20 Sep 71 0 S Chitina, Alas. USA.
 Super Cub Left axle.

G342 Piper PA 18-150 1973 0 S Camden NSW, Australia.
 Super Cub Main gear strut to fuselage attach fitting.

G369 Piper PA-18 3 Mar 74 0 S Shungnak, Alas. USA.
 Super Cub Crack in right gear.

G526 Piper PA-18 22 Apr 81 0 S Fresno, Ca. USA.
Super Cub Main gear strut assembly rod, PN 12844-04.

G535 Piper 18 Aug 81 0 S Burg Feuerstein, W. Germany.
PA-18-125 Main landing gear leg.
Super Cub

PIPER PA-20 PACER

Wing

A132 Piper PA-20 26 Nov 80 3 D East Berlin, Pa. USA.
Pacer Right wing failure. Strut lower fork assembly,
P/N 14481.

Engine

E364 Piper PA-20 18 Aug 80 0 S East Gore, N.S. Canada.
Pacer Oil line fitting in oil cooler (corrosion pits
in thread roots). Avco Lycoming O-290 engine.

Landing Gear

G374 Piper PA-20 26 Apr 74 0 S Waterloo, Iowa. USA.
Pacer Tailwheel mounting bolt.

PIPER PA-22 COLT/TRI-PACER

Wing

A103 Piper PA-22 19 Jul 72 0 S Eden Prairie, Minn. USA.
PA-22 Right wing lift strut fork. Precautionary landing
made.

A121 Piper PA-22 18 Feb 78 2 D Camden, Tenn. USA
Right wing failed (strut attach bolt). Un-
approved mod: probe attached to wing strut.

A129 Piper PA-22 2 Feb 80 2 D Princeton, Ill. USA.
Wing failure, right front lift-strut fork end,
P/N 14481-00.

Engine

E40 Piper PA-22 31 Oct 64 0 D Hanover, Ont. Canada.
PA-22 Crankshaft bearing failure caused fatigue
crack in the crank throw.

E51 Piper PA-22 13 May 65 0 S Jeffersonville, Ind. USA.
PA-22 Crankshaft flange.

E61 Piper PA-22 6 Sep 65 0 S Clermont, Ind. USA.
PA-22 Muffler (baffle failed).

E69 Piper PA-22 1 Dec 65 0 D Beaufort, S.C. USA.
PA-22 Exhaust muffler inlet pipe.

E76 Piper PA-22 24 Feb 66 0 S Hamburg, N.Y. USA.
PA-22 Exhaust pipe cracked.

E104 Piper PA-22 23 Jun 68 0 S Lac Baron, Que. Canada.
PA-22 Bolt of no. 2 connecting rod.

E109 Piper PA-22 29 Sep 68 0 S Cumberland, Md. USA.
PA-22 Camshaft gear attach bolts.

AIRCRAFT TYPE (FIXED-WING)

E116 Piper PA-22 26 Apr 69 0 S Chenango Bridge, N.Y. USA.
No. 4 cylinder barrel.

E204 Piper PA-22 8 Mar 74 0 S Compton, Cal. USA.
Piston of no. 3 cylinder.

E234 Piper PA-22 18 Jun 75 0 S Wyoming, Ont. Canada.
No. 3 exhaust valve.

E334 Piper PA-22 25 Apr 79 0 S King City, Cal. USA.
No. 2 conrod, P/N 74502.

Landing Gear
G65 Piper PA-22 20 Jun 64 0 S Satanta, Kans. USA.
Left gear shock strut at weld.

G111 Piper PA-22 8 May 65 0 S Paducah, Ky. USA.
Nose gear support tubes.

G156 Piper PA-22 13 Feb 66 0 S Flint, Mich. USA.
Nose gear mount.

G174 Piper PA-22 18 Jun 66 0 S Ronkonkoma, N.Y. USA.
Main landing gear.

G209 Piper PA-22 20 May 67 0 S Lexington, Mo. USA.
Left landing gear forward and rear vee tubes.

G384 Piper PA-22 14 Sep 74 0 S West Hickory, Pa. USA.
Nosewheel assembly.

G419 Piper PA 22-160 1976 0 S Chilchil Stn., Australia.
Right gear leg weld at bungee carrier.

G467 Piper PA-22 12 Aug 78 0 S Datil, N.M. USA.
Left tube of nose gear mount.

G521 Piper PA-22 28 Feb 81 0 S Knik Glacier, Ak. USA.
Nosewheel assembly.

Miscellaneous
H11 Piper PA-22 5 Jul 65 0 S Underwood, Wash. USA.
Master brake cylinder diaphragm.

H35 Piper PA-22-108 13 Jan 80 0 S Groblersdal, Republic of South Africa.
Brake pressure pipe at master cylinder. Origin:
belling of pipe.

PIPER PA-23 AZTEC

Tail
B29 Piper PA-23 27 Sep 77 0 S Morris, Ill. USA.
Aztec Rudder attachment. Sequin Aviation rudder STC
SA671SW failed.

Engine
E139 Piper PA-23 30 Nov 70 0 S Doylestown, Pa. USA.
Aztec Engine controls mount bracket assembly failed
at pedestal.

	<u>Propeller</u>				
F49	Piper PA-23 Aztec	27 Mar 67	0	S Granville, N.Y. USA. Right propeller attach studs.	
F173	Piper PA-23 Aztec	16 Aug 76	0	S Miami, Fla. USA. Propeller separated.	
F175	Piper PA-23 Aztec	15 Sep 76	0	D Independence, Mo. USA. 3 propeller mounting studs.	
F217	Piper PA 23-250 Aztec	4 Feb 80	0	S Williams Lake, B.C. Canada. Propeller hub spider arm. (lack of grease).	
	<u>Prop Governor Oil Line</u>				
H32	Piper PA-23 Aztec	18 Jan 79	3	D Scottown, Ohio USA. Left engine propeller governor oil line failed. Wrong part. Aluminum tube used, and manufacturer specified steel.	
	<u>Landing Gear</u>				
G97	Piper PA-23 Aztec	13 Jan 65	0	S Wilkesboro, N.C. USA. Lower nose wheel drag link.	
G118	Piper PA-23 Aztec	13 Jul 65	0	S Renesselaer, Ind. USA. Nose gear turning stop broken.	
G158	Piper PA-23 Aztec	19 Feb 66	0	S East St. Louis, Ill. USA. Nose gear retract strut.	
G249	Piper PA-23 Aztec	5 Mar 69	0	S Lake Wales, Fla. USA. Rear tube of drag brace assembly (nose wheel).	
G251	Piper PA-23 Aztec	21 Mar 69	0	S Jacksonville, Fla. USA. Nose gear upper drag link, P/N 19045-00.	
G373	Piper PA-23 Aztec	16 Apr 74	0	S Opa Locka, Fla. USA. Upper drag link, nose gear. P/N 19045.00	
G420	Piper PA 23-250 Aztec	1976	0	S Prosperine Qld., Australia. Right main gear drag link centre bolt (excessive wear).	
G518	Piper PA-23 Aztec	1981	0	S Wangi Stn, NT, Australia. Main gear drag link bolt.	

PIPER PA-24 COMMANDER

	<u>Wing</u>				
A133	Piper PA-24 Commander	1981 or 82	?	?	?
			Failure of wing lower spar cap.		
	<u>Engine</u>				
E66	Piper PA-24 Commander	4 Nov 65	0	S Homer, Ga. USA. No. 3 cylinder connecting rod cap bolts.	
E67	Piper PA-24 Commander	5 Nov 65	0	S Red Bluff, Cal. USA. Generator brushes.	

AIRCRAFT TYPE (FIXED-WING)

E71	Piper PA-24 Commanche	15 Jan 66	0	S Montgomery, La. USA. No. 1 cylinder exhaust valve.
E205	Piper PA-24 Commanche	14 Mar 74	0	S Highland Beach, Fla. USA. No. 2 conrod.
E253	Piper PA-24 Commanche	7 Jan 76	0	S Santee, Cal. USA. Crankshaft dowel pin.
E372	Piper PA-24 Commanche	30 Nov 80	1	D Annawan, Ill. USA. Crankshaft counterweight assembly P/N 71904 at machining groove.
E377	Piper PA-24 Commanche	10 Jan 81	0	S Olympia, Wa. USA. Crankshaft. During re-nitriding, temps exceeded allowable, lowering core hardness.
<u>Propeller</u>				
F231	Piper PA-24 Commanche	29 Aug 81	0	S Sacramento, Ca. USA. Propeller blade.
<u>Landing Gear</u>				
G70	Piper PA-24 Commanche	28 Aug 64	0	S Los Angeles, Cal. USA. Nose gear drag link clevis bolt, P/N 20859-00.
G85	Piper PA-24 Commanche	24 Oct 64	0	S Torrance, Cal. USA. Nose gear drag link clevis broke (threads)
G94	Piper PA-24 Commanche	10 Dec 64	0	S Philadelphia, Pa. USA. Nose gear drag link clevis (threads). P/N 20859-03.
G173	Piper PA-24 Commanche	26 May 66	0	S Salem, Ore. USA. Nose gear push-pull rod (thread at inboard end). P/N 211-09-00.

PIPER PA-25 PAWNEE

<u>Wing</u>				
A83	Piper PA-25 Pawnee	11 Aug 67	1	D Coweta, Okla. USA. Right wing failure. Spar lugs, wing attach fitting, improper weld. Role: aerial application.
A108	Piper PA-25 Pawnee	24 Aug 73	0	D Rayville, La. USA. Wing separation. Fracture of spar. Role: aerial application.
A109	Piper PA-25 Pawnee	1 Oct 73	0	D Rohwer, Ark. USA. Right wing separated. Rear mount bracket and front spar broken at mount bracket. Role: aerial application.
A111	Piper PA-25 Pawnee	18 Oct 73	1	D Slaton, Texas, USA. Wing failure (spar). Initiation at improperly-drilled rivet hole. Role: aerial application.

A131	Piper PA-25 Pawnee	2 Aug 80	1	D Dumas, Texas USA. Left wing failed (spar) where lower flange was mis-drilled. Role: crop spraying.
<u>Fuselage</u>				
C16	Piper PA-25 Pawnee	20 Aug 65	0	S Newellton, La. USA. Both upper fuselage longerons failed (poor weld).
<u>Flight Controls</u>				
D9	Piper PA-25 Pawnee	2 Jun 65	1	D Clarendon, Ark. USA. Fracture in elevator tab control system. Role: aerial application.
D40	Piper PA-25 Pawnee	1980	0	D Sassafras, Tas. Australia. Up-elevator cable rear turnbuckle failed. Non-corrosive-resistant bolt fitted & overtightened.
<u>Engine</u>				
E105	Piper PA-25 Pawnee	5 Jul 68	0	S Bosco, La. USA. Left magneto shaft.
E106	Piper PA-25 Pawnee	25 Aug 68	0	S David City, Neb. USA. Mixture control wire failed in bend radius.
E141	Piper PA 25-235 Pawnee	1971	0	D Moura, Queensland Australia. Fatigue of mixture control part. (Not genuine part.)
E181	Piper PA 25-235 Pawnee	1973	0	S Trentham Vic., Australia. Part impulse coupling cam fell between crank-shaft idler gear.
E193	Piper PA-25 Pawnee	22 Jun 73	0	S Gettysburg, S. Dak. USA. Crankshaft.
E245	Piper PA-25 Pawnee	6 Sep 75	0	S Tahoka, Tex. USA. Crankshaft.
<u>Propeller</u>				
F73	Piper PA-25 Pawnee	7 Sep 68	0	S St. Joseph, La. USA. Propeller at station 29.
<u>Landing Gear</u>				
G57	Piper PA-25 Pawnee	28 Apr 64	0	S Terrell, Tex. USA. Main gear shock strut at lower end weld.
G84	Piper PA-25 Pawnee	22 Oct 64	0	S Elmira, Cal. USA. Both landing gear shock struts at lower attach fittings. AD not complied with.
G268	Piper PA 25-150 Pawnee	1970	0	S Marlborough Qld., Australia. Undercarriage V-brace.
G320	Piper PA 25-150 Pawnee	1972	0	S Kingaroy Qld., Australia. Left main undercarriage brace tube.

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AIRCRAFT TYPE (FIXED-WING)

G364 Piper PA 25-235 Pawnee	1973	0	S Griffith NSW, Australia. Undercarriage main gear shock absorbing system. Misalignment of pivot bolt in spigot hole during aircraft rebuild. Sharp edge pivot hole/spigot.
G366 Piper PA 25-235 Pawnee	1974	0	S Oberon NSW, Australia. Left gear front attachment (poor weld).
G377 Piper PA-25 Pawnee	10 May 74	0	S Loxahatchee, Fla. USA. Right main gear shock strut P/N 64502-03.
G408 Piper PA-25-260	4 Oct 75	0	S Varkaus, Finland. Landing gear fastening bracket.

PIPER PA-28 CHEROKEE

Engine

E100 Piper PA-28 Cherokee	14 Jan 68	0	S Hazelhurst, Ga. USA. No. 2 connecting rod.
E148 Piper PA-28R Cherokee	17 Jun 71	0	S Garnett, Kans. USA. Crankshaft (front portion of # 3 main journal).
E155 Piper PA-28R Cherokee	26 Oct 71	0	S La Porte, Tex. USA. # 4 conrod cap.
E182 Piper PA 28-140 Cherokee	1973	0	S Moorabbin Vic., Australia. No. 2 connecting rod.
E197 Piper PA-28-180 Cherokee	19 Aug 73	0	D Helsinki, Finland. Forward end bearing of crankshaft broke (fatigue), due to an inside corrosion.
E267 Piper PA-28-140 Cherokee	10 Aug 76	2	? Helsinki, Finland. Exhaust valve of Lycoming O-320-E3D engine.
E278 Piper PA-28 Cherokee	12 May 77	0	S Iowa City, Iowa. USA. Engine cylinder assembly.
E288 Piper PA-28R Cherokee	20 Aug 77	0	S Los Angeles, Cal. USA. Conrod bolts.
E312 Piper PA-28 Cherokee	16 Jul 78	0	S Saitama Pref., Japan. #2 cylinder exhaust push rod.
E313 Piper PA-28 Cherokee Cruiser	19 Jul 78	0	S Causapscal, Que. Canada. Avco Lycoming O-360 engine. #3 cylinder. Air- craft had flown only 17 hours in 12 years.
E350 Piper PA-28R Cherokee	12 Feb 80	0	S Sherman, Il. USA. Crankshaft.
E357 Piper PA-28 Cherokee Cruiser	9 May 80	3	D Desboro, Ont. Canada No. 3 cylinder, piston & rod assembly separated from engine. Fracture of all 8 cylinder studs (improper torquing of studs)

E388	Piper PA-28 Cherokee Cruiser	5 Jun 81	0	S Stony Rapids, Sask. Canada. Exhaust valve at stem-to-head fillet. Origin: corrosion pits.
E392	Piper PA-28 Cherokee	19 Jul 81	1	D Buckland, NC. USA. No. 3 cylinder exhaust valve (guide worn).
F21	<u>Propeller</u> Piper PA-28 Cherokee	9 Dec 64	0	S Burbank, Cal. USA. Propeller blade.
F33	Piper PA-28 Cherokee	11 Jan 66	0	S Fayetteville, Ark. USA. Propeller blade.
F38	Piper PA-28 Cherokee	10 Jul 66	0	S Flushing, N.Y. USA. Propeller blade. (Origin: small pit on surface).
F39	Piper PA-28 Cherokee	23 Jul 66	0	S Columbia City, Ind. USA. Propeller blade failed across the mid-blade decal, required corrosion inspection not done.
F80	Piper PA-28 Cherokee	10 Aug 69	1	D Los Angeles, Calif. USA. 16 in. of one propeller blade broke off.
F93	Piper PA-28 Cherokee	11 Apr 71	0	S Elmira, Cal. USA. No. 1 blade, 19" from tip. AD not complied with
F99	Piper PA-28R Cherokee	30 Jun 71	0	S Carrollton, Ky. USA. Prop blade 4" from tip.
F119	Piper PA 28-180 Cherokee	1973	0	S Warwick Qld. Australia. 6 inches of prop blade shed (stone damage).
F152	Piper PA-28 Cherokee	6 Jul 75	0	S Weston, W.V. USA. Lost 22" of blade. AD not complied with.
F167	Piper PA-28R Cherokee	22 Feb 76	0	S Little Rock, Ark. USA. 6 prop bolts failed.
F180	Piper PA-28R Cherokee	9 Mar 77	0	S Petal, Miss. USA. Hartzell 7666 propeller blade.
F190	Piper PA 28-180 Cherokee	1978	0	S Glen Innes, NSW, Australia. Prop blade.
F196	Piper PA 28R-180 Cherokee	5 May 78	0	S Ehime Pref., Japan. Oil line tube assembly of propeller governor (stress concentration).
F197	Piper PA-28 Cherokee	8 May 78	0	S Royalton, N.Y. USA. Propeller blade.
F206	Piper PA-28 Cherokee	22 Dec 78	4	D Kennett, Mo. USA. Propeller separated.

F213 Piper PA-28 16 Aug 79 2 D Wildwood, Alta. Canada.
 Cherokee
 Cruiser 5 inches of propeller blade separated. Crack in
 blade previously repaired by removal of material,
 but incipient crack remained. 1528 airframe hours

Landing Gear

G122 Piper PA-28 18 Aug 65 0 S Culver, Ind. USA.
 Cherokee Nose gear strut.

G196 Piper PA-28 16 Jan 67 0 S Pasadena, Md. USA.
 Cherokee Nose wheel strut mount, adjacent to weld.

G238 Piper PA-28 22 Sep 68 0 S Canandaigua, N.Y. USA.
 Cherokee Nose gear shock strut piston.

G323 Piper PA-28-140 1 May 72 0 S St. Hubert, Que. Canada.
 Cherokee Right gear lower torque link (scissor). AD not
 complied with.

G325 Piper PA-28-140B 12 May 72 0 S St. Hubert, Que. Canada.
 Cherokee Right gear upper torque link (AD not complied
 with).

G368 Piper PA-28 14 Feb 74 0 S Sanford, Fla. USA.
 Cherokee Two lugs on main-gear cylinder P/N 65319-03.

G433 Piper PA-28 9 Jul 76 0 S Big Bear City, Cal. USA.
 Cherokee Main gear, upper scissors gear strut lugs.

G440 Piper PA-28-140 1977 0 S Bankstown, NSW Australia.
 Cherokee Left main gear torque link (lower shackle bolt)

G442 Piper PA-28-140 1977 0 S Murray Bridge, S.A. Australia.
 Cherokee Torque link bolt in main undercarriage.

G527 Piper PA-28 28 Apr 81 0 S Sept Iles, Que. Canada.
 Cherokee Right main gear torque links, AD not complied
 with.

PIPER PA-30 TWIN COMMANDER

Engine

E219 Piper PA-30 2 Oct 74 0 S Leavenworth, Kans. USA.
 Twin Commande Crankshaft.

Propeller

F86 Piper PA-30-160 24 Nov 69 1 D Dandaloo, N.S.W. Australia.
 Twin Commande Most of propeller blade separated. Origin:
 corrosion in balancing cavity.

F101 Piper PA-30 6 Aug 71 0 S Bloomington, Ill. USA.
 Twin Commande Left prop blade near hub.

Landing Gear

G189 Piper PA-30 14 Sep 66 0 S Louisville, Ky. USA.
 Twin Commande Ball joint end of landing gear actuating
 conduit pin 455180 (outboard end of threads).

PIPER PA-31 NAVAJO/CHEYENNE

<u>Engine</u>					
E352	Piper PA-31T Cheyenne	12 Mar 80	0	S	Kettleman City, Ca. USA. 2 compressor turbine vanes eroded and 3 blades fractured.
E389	Piper PA-31P Pressurised Navajo	8 Jun 81	0	S	Dallas, Tx. USA. Left engine lower tailpipe bracket failed. No inspection as per AD.
<u>Propeller</u>					
F126	Piper PA-31 Navajo	25 Sep 73	0	S	Roswell, N. Mex. USA. 1 foot of right prop blade shed.
F208	Piper PA-31 Navajo	26 Jan 79	0	S	Lima, N.Y. USA. Right propeller blade tip. Hartzell HCE-24R-2CT
<u>Landing Gear</u>					
G418	Piper PA 31-310 Navajo	1976	0	S	Moorabbin Vic., Australia. Hinge on right gear door.
G503	Piper PA 31-310 Navajo	30 Apr 80	0	S	St. Hubert, Que. Canada. Front hinge of right inboard gear door. Origin: coarse grinding of forging flash on inner radius.

PIPER PA-32 CHEROKEE SIX

<u>Tail</u>					
B34	Piper PA-32 Cherokee SIX	1979	2	D	Marulan, NSW Australia. Right-hand stabilator failed.
<u>Engine</u>					
E124	Piper PA-32 Cherokee SIX	12 Apr 70	0	D	Belle, Mo. USA. Foreign piece of metal enmeshed in crankshaft idler gear, causing gear failure.
E210	Piper PA-32 Cherokee SIX	4 Jun 74	0	S	Friendship, Wis. USA. Oil filter center stud P/N 5579427.
E221	Piper PA-32 Cherokee SIX	23 Oct 74	1	D	Huntsville, Texas USA. No. 3 cylinder separated. Holddown studs under-torqued, through bolts failed.
E255	Piper PA-32 Cherokee SIX	12 Jan 76	0	S	Big Spring, Tex. USA. Crankshaft.
E293	Piper PA-32 Cherokee SIX	9 Sep 77	0	S	Verden-Sch., W. Germany. Locking bolt on DC generator/alternator.
E308	Piper PA-32 Cherokee SIX	23 Jun 78	0	S	Goshen, Ind. USA. # 4 cylinder.
E398	Piper PA-32 Cherokee SIX	23 Sep 81	0	S	Cranbrook, B.C. Canada. Crankshaft web.

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AIRCRAFT TYPE (FIXED-WING)

E402	Piper PA-32 Cherokee SIX	24 Nov 81	0	S Woodland, Ca. USA. Crack in no. 5 cylinder from spark plug hole to cooling fins.
	<u>Propeller</u>			
F132	Piper PA-32 Cherokee SIX	29 Mar 74	0	S Minto, Alas. USA. Propeller (pitch change dowel).
F158	Piper PA-32 Cherokee SIX	14 Oct 75	0	D South Boston, Va. USA. Propeller blade pitch-change dowel failed, causing propeller failure.
F224	Piper PA-32 Cherokee SIX	1 Nov 80	0	S Carlsbad, N.M. USA. 8 inches of propeller shed. Origin: nick.
	<u>Landing Gear</u>			
G314	Piper PA-32 Cherokee SIX	15 Sep 71	0	S Boonville, Mo. USA. Axe of right gear (tool mark at base of axle centre bore).
G390	Piper PA 32-260 Cherokee SIX	1975	0	S Iffley Stn. Qld, Australia. Left gear torque link bolt.

PIPER PA-34 SENECA

E279	<u>Engine</u> Piper PA-34 Seneca	26 May 77	1	D Bridgeport, WV, USA. Crankshaft (no. 3 main bearing journal).
G534	<u>Landing Gear</u> Piper PA-34 Seneca	10 Aug 81	0	S Wenatchee, Wa. USA. Main landing gear.

PIPER PA-36 PAWNEE BRAVE

E214	<u>Engine</u> Piper PA-36 Pawnee Brave	2 Aug 74	0	S Winnemucca, Nev. USA. Crankshaft.
E277	Piper PA-36 Pawnee Brave	20 Apr 77	0	S Brawley, Cal. USA. No. 4 exhaust valve (thermal fatigue).
	<u>Landing Gear</u>			
G523	Piper PA 36-375 Pawnee Brave	14 Mar 81	0	S Geraldine, New Zealand. Left gear leg. Radius outboard of fuselage. Time on part: 1487 hrs. Matl: AISA 6150 steel.
G531	Piper PA 36-375 Pawnee Brave	29 Jun 81	0	S Whana Whana, New Zealand. Left gear leg at radius outboard of fuselage. 1085 hours on part. Matl: UNS H61500 spring steel.

PIPER PA-38 TOMAHAWK

E371	<u>Engine</u> Piper PA-38 Tomahawk	17 Nov 80	2	D Santa Rosa, Calif. USA. Pushrod of #4 intake valve flared. Thermal fatigue of valve.
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Landing Gear

G536 Piper PA-38-112 Tomahawk 17 Sep 81 0 S Ardmore, New Zealand.
Front clamping bolt, left gear leg. Airframe hours: 700.

PITTS SPECIAL

Tail

B22 Pitts S-2A Special 3 Aug 72 0 S Miami, Fla. USA.
Forward attach tube of right horizontal stabilizer. Role: aerobatics.

Flight Controls

D43 Pitts S-1S 4 May 80 1 D Fort Wayne, In. USA.
Elevator push-pull tube at rod end bearing (lack of lubrication).

Propeller

F71 Pitts Special 21 Jul 68 1 D Arco, Id. USA.
Propeller blade separated 18 in. from tip.

PZL-102 KOS

D5 PZL-102 Kos 13 May 62 2 D Joensuu Airport, Finland.
Supporting bracket of pedal.

R.F.C. SKYRIDER (ULTRALIGHT)

H37 R.F.C. Skyrider 20 (ultralight) 4 Jul 82 2 D Clappisons Corners, Ont. Canada.
Propeller driveshaft rear bearing lower housing

REPUBLIC SEABEE

E98 Engine Republic RC-3 Seabee 20 Oct 67 0 S Goleta, Cal. USA.
Mixture control cable bracket.

E229 Republic RC-3 Seabee 13 Apr 75 2 D Markham, Ont. Canada.
No. 6 cylinder.

REPUBLIC F-84 THUNDERSTREAK

A38 Wing Republic F-84 Thunderstreak (USAF) 1953 ? ? ?
Wing failure.

Fuselage

C4 Republic F-84 Thunderstreak (USAF) 1953-59 ? ? ?
Fuselage failure.

REPUBLIC F-105 THUNDERCHIEF

C13 Fuselage Republic F-105B Thunderchief (USAF) 9 May 64 1 D Hamilton Air Force Base, USA.
Aircraft broke in two. Fuselage failure at tank cover, FS 350. Role: Thunderbird demonstration team. Airframe hours: 600. Material: 7075-T6.

C15 Republic F-105D-4 Thunderchief (USAF) Jun 65 1? D USA?
Fuselage failure at splice at fuselage tank cover, FS 350. Material: 7075-T6.

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AIRCRAFT TYPE (FIXED-WING)

RLU BREEZY

Flight Controls

D39 RLU Breezy 22 Sep 79 2 D Frazer, Mi., USA.
RLU-1
Fracture of lower weld in aileron cable pulley bracket. (Weld surface heavily oxidized.)

ROBIN/CENTRE EST DR 253 REGENT

Engine

E314 Centre Est 29 Jul 78 0 S Leer-Nuettermoor, W. Germany.
DR 253
Exhaust valve.

ROBIN/CENTRE EST DR 400

Muffler

E257 Centre Est 29 Feb 76 0 D Gelnhausen, W. Germany.
DR 400
Fatigue failure of non-approved muffler.

Engine Mount

H36 Robin 28 Jun 81 0 S Bad Neuenahr, W. Germany.
DR 400
Engine mount.

ROCKWELL COMMANDER (See Aero Commander)

ROCKWELL OV-10 BRONCO

G493 Rockwell 1980 ? ? USA?
OV-10A Bronco
(USAF)
Nose gear fork at fillet radius just aft of jack point. Matl: 7075-T73 forging.

RYAN PT-22

E348 Engine Ryan PT-22 5 Feb 80 0 S Oakland, Ca. USA.
Crankshaft.

S.A.N. JODEL

E138 Engine Jodel F-11 17 Oct 70 0 S Vernon, Ont. Canada.
Crankshaft (improper reconditioning).

E198 S.A.N. Jodel 3 Sep 73 3 D Brixham, U.K.
D.117
No. 2 cylinder at head attachment thread.

Landing Gear

G519 Jodel D11 1981 0 S Camden NSW, Australia.
Upper section of strut, left gear (weld).

SAAB-SCANIA 32 LANSEN

E135 Engine Saab-Scania 13 Aug 70 0 D Oxelosund, Sweden.
A32A Lansen
(Swedish AF)
Fuel pipe.

E166 Saab-Scania 12 Apr 72 0 D Ostersund, Sweden.
S32C Lansen
(Swedish AF)
Fuel pipe.

E246 Saab-Scania 9 Sep 75 0 D Strangnas, Sweden.
A32A Lansen
(Swedish AF) Turbine disc.

E248 Saab-Scania 17 Nov 75 0 S Vanersborg, Sweden.
A32A Lansen
(Swedish AF) Compressor disc.

SAAB-SCANIA 35 DRAKEN

Engine
E93 Saab-Scania 10 May 67 0 D Soderkoping, Sweden.
S35E Draken
(Swedish AF) Compressor blade.

E127 Saab-Scania 3 Jun 70 0 D Aalborg, Denmark.
S35E Draken
(Swedish AF) Compressor blade.

E136 Saab-Scania 16 Sep 70 0 D Arvidsjaur, Sweden.
S35E Draken
(Swedish AF) Compressor blade.

E185 Saab-Scania 10 Jan 73 0 D Vasteras, Sweden.
J35F Draken
(Swedish AF) Compressor blade.

E232 Saab-Scania 5 Jun 75 0 D Lulea, Sweden.
S35E Draken
(Swedish AF) Compressor blade.

E298 Saab-Scania 23 Nov 77 0 D Angelholm, Sweden.
J35F Draken
(Swedish AF) Turbine disc.

E310 Saab-Scania 30 Jun 78 0 D Vasteras, Sweden.
J35F Draken
(Swedish AF) Turbine disc.

E328 Saab-Scania 6 Feb 79 0 D Vastervik, Sweden.
J35F Draken
(Swedish AF) Turbine screw.

E341 Saab-Scania 30 Aug 79 0 D Katrineholm, Sweden.
S35E Draken
(Swedish AF) Turbine disc.

Miscellaneous
H27 Saab-Scania 6 Apr 77 0 D Nykoping, Sweden.
S35E Draken
(Swedish AF) Support profile in engine exhaust.

SAAB SCANIA AJ37 VIGGEN

Wing
A113 Saab-Scania 11 Jul 74 0 D Just south of Lake Vanern, Sweden.
AJ37 Viggen
(Swedish AF) Port wing failure. Main spar, close to root.

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AIRCRAFT TYPE (FIXED-WING)

A115 Saab-Scania 6 Oct 75 0 D Lake Vanern, Sweden.
AJ37 Viggen Port wing failure. Main spar, close to root.
(Swedish AF)

A116 Saab-Scania 10 Oct 75 0 D Baltic Sea near Sweden.
AJ37 Viggen Right wing failure. Main spar, close to root.
(Swedish AF)

Engine
E200 Saab-Scania 9 Oct 73 0 D Linkoping, Sweden.
AJ37 Viggen Compressor disc.
(Swedish AF)

E244 Saab-Scania 27 Aug 75 0 D Karlsborg, Sweden.
Viggen Compressor blade.
(test aircraft)

E294 Saab-Scania 22 Sep 77 0 D Lidkoping, Sweden.
AJ37 Viggen Failure of ball retainer in drive-shaft ball-
(Swedish AF) bearing.

E379 Saab-Scania 10 Feb 81 0 D Karlsborg, Sweden.
AJ37 Viggen Shaft failure in engine gear-box due to ball-
(Swedish AF) bearing failure.

E397 Saab-Scania 29 Aug 81 0 D Lulea, Sweden.
SF37 Viggen Fuel pipe.
(Swedish AF)

Miscellaneous
H22 Saab-Scania 15 Nov 76 0 D Edsbyn, Sweden.
SK37 Viggen Attachment of engine front cowl.
(Swedish AF)

H25 Saab-Scania 10 Mar 77 0 D Vastervik, Sweden.
SH37 Viggen Heat shield in engine.
(Swedish AF)

SCHEIBE BERGFALKE III (SAILPLANE)

Miscellaneous
H29 Scheibe 9 Aug 77 0 S Unterwoessen, W. Germany.
Bergfalke-III Clutch support structure strut assembly.

SCHEIBE SF-26 STANDARD (SAILPLANE)

Flight Controls
D27 Scheibe 25 May 75 0) Perris, Ca. USA.
SF-26A Right aileron bellcrank failed in flight.
sailplane Pilot bailed out.

SCHEIBE ZUGVOGEL (SAILPLANE)

Flight Controls
D35 Scheibe 10 Sep 78 0 S Kreuzberg-Kronach, W. Germany.
Zugvogel III-B Right spoiler drive.

SCHLEICHER K 8 (SAILPLANE)

D33 Flight Controls
Schleicher 10 Jul 77 0 D Guetersloh, W. Germany.
K 8 Elevator control rod.

SCHWEIZER TSC-1A

G381 Landing Gear
Schweizer 9 Aug 74 0 S Kissimmee, Fla. USA.
TSC-1A Landing gear strut.

SCOTTISH AVIATION TWIN PIONEER

A50 Wing
Scottish Aviation Twin Pioneer 30 Aug 57 3 D Off Jahan Island, New Guinea.
Separation of right wing. Failure of V-brace strut.

A52 Scottish Aviation Twin Pioneer 7 Dec 57 6 D Fezzan, Libya.
Failure in forward tube of V-brace strut, port wing. Outer wing panel separated. Material: 4T2 steel. Airframe hours: 564.

SIAI-MARCHETTI S.205

G463 Landing Gear
SIAI-Marchetti 205-20/R 11 Jun 78 0 S Straubing, W. Germany.
Left main gear actuator rod (thread).

SIAI-MARCHETTI SF.260

E382 Engine
SIAI-Marchetti SF.260M (Belgian AF) 13 Mar 81 0 D Renaix, Belgium.
Failure of crankshaft lug due to bad installation of counterweight rollers.

SMITH AEROSTAR (See Ted Smith Aerostar)

SNOW S-2

E159 Engine
Snow Commander S2D 6 Dec 71 0 S Thompson Town, Jamaica.
Master connecting rod at crank pin end.

E175 Snow S-2D 18 Sep 72 0 S Ngakuru, New Zealand.
Master rod piston pin bore.

E176 Snow Commander S2D 25 Sep 72 0 S Windsor, Jamaica.
No. 1 cylinder connecting rod.

E194 Snow S2C 30 Jun 73 0 S Pearsall, Tex. USA.
Crevice corrosion found on no. 7 piston pin.
Fatigue fracture.

E241 Snow Commander S2D 15 Aug 75 0 S Riversdale, Jamaica.
Master connecting rod.

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AIRCRAFT TYPE (FIXED-WING)

	<u>Propeller</u>			
F43	Snow 600 S-2C	29 Aug 66	0	S Bay, Ark. USA. Propeller blade, 13 inches from tip.
F65	Snow S-2A	15 Nov 67	1	D Dateland, Ariz. USA. Propeller blade.
F100	Snow S-2D	4 Aug 71	0	S Moana, New Zealand. 7 inches of blade shed (stone damage).
	<u>Landing Gear</u>			
G332	Aero Commander Snow	3 Aug 72	0	S Cashmore Airstrip Kinleith, New Zealand. AN9-52 bolt, linking upper tripod to shock strut of right gear.

SOCATA 880/885/892/893/894 RALLYE

	<u>Engine</u>			
E322	Socata 893A Rallye Commodore	19 Nov 78	0	S Duena, W. Germany. Broken oil line of engine.
	<u>Propeller</u>			
F157	Socata 894A Rallye Minerva	26 Sep 75	0	S Hamm-Lippewiesen, W. Germany. Adjustment fork broken in hydraulic pitch control system for propeller.
	<u>Landing Gear</u>			
G353	Socata 880B Rallye Club	17 Jul 73	0	S Bad Duerkheim, W. Germany. Strut attachment of front gear leg.
G400	Socata 892A Rallye-Commodore	17 Jun 75	0	S Huensborn, W. Germany. Nosewheel axle spindle bolts.
G409	Socata 885 Super Rallye	12 Oct 75	0	S Noerdlingen, W. Germany. Main landing gear strut attachment.

SPORTAVIA RF4D AVION-PLANEUR (MOTOR GLIDER)

	<u>Landing Gear</u>			
G354	Sportavia RF4D Avion-Planeur	5 Aug 73	0	S Vielbrunn, W. Germany. Landing gear.

STAMPE SV-4B

	<u>Engine</u>			
E369	Stampe SV-4B	10 Oct 80	0	D Baragwanath, Republic of South Africa. Crankshaft failed just behind thrust bearing. Origin: corner of keyway which locates prop hub flange. Gipsy Major 1 Mark 10-3 engine.

STEARMAN KAYDET (See Boeing/Stearman 75 Kaydet)

STEEN SKYBOLT I

	<u>Engine</u>			
E358	Steen Skybolt I	22 May 80	0	S Brantford, Ont. Canada. Connecting rod bolt. Induced by over-speeding attributed to conversion of approved constant speed prop to fixed pitch.

STINSON A2W

Wing
A25 Stinson A2W 10 Jan 45 10 D Spring Plains, Victoria, Australia.
Left wing failure. Joint in welded steel tube between outer & centre sections of wing.
Material: X4130 steel. 13,763 airframe hours.

STINSON 76 SENTINEL (L-5)

Landing Gear
G309 Stinson L-5G 27 Jun 71 0 S Murfreesboro, Tenn. USA.
Tail wheel (old crack). Annual inspection over-due.

STINSON SR-8C RELIANT

Landing Gear
G444 Stinson SR-8C 10 Apr 77 0 S Eveleth, Minn. USA.
Landing gear.

STINSON V-77

Engine
E145 Stinson V-77 2 Apr 71 0 S Pleasant Plain, Ohio. USA.
2 connecting rod (upper end).

Landing Gear
G210 Stinson V-77 20 May 67 0 S Lincoln, R.I. USA.
Left landing gear oleo piston rod.

STINSON 108

Engine
E31 Stinson 108 26 Jan 64 0 S Hammond, La. USA.
No. 5 cylinder at barrel casting.

E55 Stinson 108-2 24 Jun 65 0 D Kenosha, Wis. USA.
No. 4 cylinder exhaust valve.

E60 Stinson 108-2 4 Sep 65 0 S Oak Hill, W.Va. USA.
No. 6 cylinder exhaust valve.

E187 Stinson 108-1 23 Jan 73 0 S Fort Pierce, Fla. USA.
No. 1 cylinder (at base).

E207 Stinson 108-1 17 Mar 74 0 S Tekoa, Wash. USA.
Muffler fatigue fracture.

E258 Stinson 108-1 24 Apr 76 1 D Aglasterhausen, West Germany.
Crankshaft.

E332 Stinson 108-2 14 Apr 79 0 S Sidney, Mont. USA.
No. 1 cylinder at base.

E359 Stinson 108 Voyager 9 Jun 80 0 S Rockland, Ont. Canada.
Crankshaft aft of front main bearing. Origin: grinding crack. Franklin 6A engine.

E386 Stinson 108-1 13 Apr 81 0 D Manahawkin, NJ, USA.
Crankshaft, P/N 17576, failed at crankcheek between no. 1 & 2 crankpin journals.

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AIRCRAFT TYPE (FIXED-WING)

	<u>Propeller</u>			
F22	Stinson 108-3	29 Dec 64	0	D Van Nuys, Calif. USA. Propeller blade.
F32	Stinson 108	19 Aug 65	0	S Fairbanks, Alas. USA. Prop blade. Metal leading edge separated from wood prop blade.
F61	Stinson 108	22 Oct 67	0	S Moweaqua, Ill. USA. Crankshaft propeller bolt flange.
	<u>Landing Gear</u>			
G126	Stinson 108-2	1 Sep 65	0	S Huron, S.Dak. USA. Tail wheel attach tubing structure.
G130	Stinson 108-1	28 Sep 65	0	S Grand Rapids, Mich. USA. Tail wheel spring assembly.
G159	Stinson 108-1	20 Feb 66	0	S Shirley, Mass. USA. Right main gear hinge pin.
G205	Stinson 108-1	9 Apr 67	0	S Brookhaven, N.Y. USA. Tubular member attached to tailwheel and fuselage failed.

STITS

	<u>Tail</u>			
B15	Glendening Stits	24 Dec 67	1	D Corona, Calif. USA. Left horizontal-stabilizer attach fitting.
B23	Stits SA-3A Playboy	10 Jun 73	1	D Macomb, Illinois USA. Horiz. stabilizer failed. Lead edge mount tube broken at attach hole.
	<u>Landing Gear</u>			
G218	Stits SA3B	2 Sep 67	0	S Owatonna, Minn. USA. Failure of pedal torque tube attached to nose steering broken welds on brace tubes from engine mount to gear.

STOLP STARDUSTER

	<u>Landing Gear</u>			
G501	Stolp Starduster Too	5 Apr 80	0	S Ashland, Oh. USA. Main gear, tubular structure at fuselage attachment point.

SUD-AVIATION (See Aerospatiale)

SWEARINGEN SA-226 METRO II

	<u>Engine</u>			
E405	Swearingen SA-226TC Metro II	23 Mar 82	0	S Saskatoon, Sask. Canada. Stator support (thermal fatigue due to engine start-ups). 5298 cycles. Garret Airesearch 331 engine.
	<u>Landing Gear</u>			
G507	Swearingen SA-226A	16 Jun 80	0	S Birmingham, Al. USA. Right main gear door uplock roller.

TAYLORCRAFT BC-65

<u>Engine</u>					
E86	Taylorcraft BC-65	2 Aug 66	0	S Midland, Mich. USA. Throttle shaft separated from carburetor throttle arm.	
<u>Landing Gear</u>					
G140	Taylorcraft BC-12D1	7 Nov 65	0	S Westerly, R.I. USA. Tube brace strut, left main gear (weld repair).	

TED SMITH AEROSTAR

<u>Engine</u>					
E346	Ted Smith Aerostar 601P	16 Nov 79	3	D Charlstadt, N.J. USA. Exhaust pipe assembly at flange weld	
<u>Landing Gear</u>					
G274	Ted Smith Aerostar 600	1 Apr 70	0	S Bedford, Pa. USA. Main landing gear piston. Cracks formed during heat treatment process.	
G470	Ted Smith Aerostar 601P	20 Sep 78	0	S Stansted, UK. Torque links on both main gear legs.	

TEMCO D-16

<u>Propeller</u>					
F28	Temco D-16A	7 Apr 65	0	D Jacksonville, Texas USA. Right propeller blade, 30 in. from hub.	
<u>Landing Gear</u>					
G161	Temco D-16A	16 Mar 66	0	S Jackson, Miss. USA. Nose gear collar attach retract rods.	

THORP T-18 TIGER

<u>Propeller</u>					
P210	Thorop T-18 Tiger	11 May 79	0	D Zillah, Wa. USA. Propeller blade.	

TRANSAVIA PL-12 AIRTRUK

<u>Propeller</u>					
F108	Transavia PL-12 Airtruk	3 Mar 72	0	S Roydon Downs, New Zealand. Propeller hub.	
F113	Transavia PL-12 Airtruk	26 May 72	0	S Wainui, New Zealand. Propeller blade (thread).	
F166	Transavia PL-12 Airtruk	18 Feb 76	0	S Matahiwi, New Zealand. Propeller blade.	
<u>Landing Gear</u>					
G265	Transavia PL-12 Airtruk	1970	0	S Narrabri, NSW, Australia. Nose landing gear strut.	
G317	Transavia PL-12 Airtruk	1972	0	S Mudee, NSW, Australia. Port landing gear, inner pivot attach lug.	
G318	Transavia PL-12 Airtruk	1972	0	S Omeo, Vict. Australia. Nose gear at weld.	

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AIRCRAFT TYPE (FIXED-WING)

G339	Transavia PL-12 Airtruk	1973	0	S	Corryong, Vict., Australia. Nose gear support structure faulty.
G358	Transavia PL-12 Airtruk	6 Sep 73	1	S	Swan Vale, N.S.W., Australia. Nosewheel steering pin.
G363	Transavia PL-12 Airtruk	1974	0	S	Geraldton, WA, Australia. Right main wheel pivot bracket (weld).
G364	Transavia PL-12 Airtruk	1974	0	S	Mudgee, NSW, Australia. Poor weld, nose strut to engine mount.
G376	Transavia PL-12 Airtruk	6 May 74	1	S	Ashley-Clinton, New Zealand. Incompletely-modified nosewheel pivot leg assembly failed.
G473	Transavia PL-12 Airtruk	1979	0	S	Mudgee, NSW, Australia. Right main gear, attach lugs.

TRAVEL AIR D4000

G246	<u>Landing Gear</u> Travel Air D4000	20 Jan 69	0	S	Tallulah, La. USA. Right main gear separated at fuselage.
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TURBULENT

E30	<u>Engine</u> Turbulent	26 May 63	0	D	Guildford, UK. Crankshaft.
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UTVA WEIHE (SAILPLANE)

D30	<u>Flight Controls</u> UTVA Weihe	11 Jul 76	0	S	Alte Ems, W. Germany. Left hand rudder cable.
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VARGA 2150 KACHINA (MORRISEY 2150)

D47	<u>Flight Controls</u> Varga 2150A Kachina	31 Jul 81	2	D	Stevensville, Md. USA. Elevator horn P/N VAC 6000K-26 failed.
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G114	<u>Landing Gear</u> Morrisey 2150A	19 May 65	0	S	Gainesville, Ga. USA. Left gear scissor attach bracket
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VICKERS SUPER VC.10

D13	<u>Flaps</u> Vickers Super VC.10	9 Aug 67	0	S	New York, N.Y. USA. Section of starboard flap separated (broken lug on flap trolley).
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VICKERS VANGUARD

C21	<u>Fuselage</u> Vickers 951 Vanguard	2 Oct 71	63	D	Aarsele, Belgium. Rear bulkhead failure, causing separation of both tailplanes. Initiated by stress corrosion
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VICKERS VIKING

A32	<u>Wing</u> Vickers Viking	1951	0	S Central Africa. Inspection found centre-section spar boom completely failed. Failure probably occurred with "bang" 3 months previously, but post-flight inspection could not locate failure at that time. Matl: DTD 464 (equiv 24ST). 6800 airframe hrs.
A42	Vickers Viking	29 Mar 53	13	D Mtara, Tanganyika. Wing failure. Single-spar mainplane joint, lower spar boom, WS 141. Material: DTD 363 (equiv 75ST). Airframe hours: 8800

VICKERS VISCOUNT

A88	<u>Wing</u> Vickers Viscount 720C	31 Dec 68	26	D Port Hedland, Western Australia. Separation of starboard wing. Main spar lower boom, WS 143. Fatigue endurance reduced by insertion of flared bushings.
B25	<u>Tail</u> Vickers Viscount 785	8 Jun 74	44	D Cerro El Retiro, Colombia. Separation of left tailplane (spar).
D4	<u>Flaps</u> Vickers Viscount 701	14 Mar 57	20	D Manchester, England. Bolt failure, starboard no. 2 flap attachment.
E74	<u>Engine</u> Vickers Viscount	6 Feb 66	0	S Lyons/Paris, France. Annulus gear in reduction section of #1 engine.
E90	Vickers Viscount 724	17 Dec 66	0	S Edmonton, Alta. Canada. 1st stage impeller, no. 3 engine compressor.
F57	<u>Propeller</u> Vickers Viscount	23 Jul 67	0	S Over Germany. Propeller retaining bolt (incorrect assembly).
G6	<u>Landing Gear</u> Vickers Viscount	12 Dec 54	0	S Blackbushe Airport, UK. Back-stay bracket of right gear.
G7	Vickers Viscount	30 Apr 57	0	S Townsland, Qld. Australia. Trunnion block. Nose gear actuating jack disconnected from strut.
G11	Vickers Viscount 700D	3 Apr 59	0	S Detroit, Mich. USA. Distortion of landing gear uplock lever due to fatigue cracks.
G213	Vickers 745D Viscount	26 Jun 67	0	S Grand Rapids, Mich. USA. Nose wheel pivot pin (lubrication holes).

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AIRCRAFT TYPE (FIXED-WING)

G224 Vickers 745D Viscount	28 Nov 67	0 S	Raleigh-Durham, N.C. USA. Valve body of nose wheel steering jack twin relief valve.
G351 Vickers Viscount	8 Jun 73	0 S	East Midlands, UK. Nose undercarriage support structure.
G406 Vickers Viscount	14 Sep 75	0 S	Guernsey, Channel Is., UK. Nosewheel rear drag members in plane of rear flange member of downlock beam.
G484 Vickers Viscount VC-2	25 May 79	0 S	Cardiff Airport, Wales, UK. Bolt in uplock mechanism of left gear.

VICKERS-ARMSTRONGS WELLINGTON

<u>Wing</u>			
A4 Vickers-	May 42 to	?	D England.
to Armstrongs	1944		Wing failure. Lower spar boom at serration of boom joint outboard of nacelle (WS 41). 20 aircraft lost in 2-year period. Most failures at WS 41. Airframe hours: 180-400
A23 Wellington			

VICTA 210 AIRCRUISER

<u>Engine</u>			
E150 Victa 210 CS	30 Jul 71	0 S	Cromwell, New Zealand. Fuel discharge tube.

VOLLMER SPORTSMAN

<u>Engine</u>			
E215 Vollmer Sportsman	3 Aug 74	0 S	Webster, Wis. USA. No. 1 and 3 exhaust stacks.

VOLPAR 18 (See Beech 18)

VOUGHT A-7 CORSAIR II

<u>Engine</u>			
E161 LTV A-7 Corsair II (USAF or USN)	1972	?	D USA? Spacer collar between 1st & 2nd compressor stages, Rolls-Royce Allison TF41 Spey engine.
E162 LTV A-7 Corsair II (USAF or USN)	1972	?	D USA? Spacer collar between 1st & 2nd compressor stages, Rolls-Royce Allison TF41 Spey engine.
E163 LTV A-7 Corsair II (USAF or USN)	1972	?	D USA? Spacer collar between 1st & 2nd compressor stages, Rolls-Royce Allison TF41 Spey engine.

<u>Landing Gear</u>			
G294 Vought A-7 Corsair II (USAF)	1971	1	?? Nose gear failed during catapult launch. Crack in landing gear strut.
G295 Vought A-7 Corsair II (USAF)	1971	0	?? Nose gear failed during catapult launch. Crack in landing gear strut.

WACO UPF-7

Propeller
F189 Waco UPF-7

29 Oct 77 2 D Palmyra, NY. USA.

13 in. of propeller blade separated.

WITTMAN TAILWIND

Landing Gear
G514 Wittman
Tailwind

4 Nov 80 0 S Payson, Az. USA.

Modified fork shaft housing on tail wheel assembly at weld bead.

ZLIN (See Morovan Zlin)

TYPE UNKNOWN (FIXED WING)

Wing
A3 Type unknown

pre 1940 1? D USA?

Welded wing strut failed, causing collapse of wing and fatal crash.

TYPE UNKNOWN (FIXED WING)

Tail
B5 Type unknown
(probably US military)

pre-1945 ? D USA?

Vertical tail separated. Crack in stabilizer rear spar attachment to fuselage, starting at free edge of 0.051 Al alloy. Failures after 2000 hours.

TYPE UNKNOWN (FIXED WING BOMBER)

Wing
A64 Military
bomber
(French)

approx 1963 ? D France?

Wing failure. Lower boom, forward spar, 2014 forging. Origin: fretting at bolt hole edge.

TYPE UNKNOWN (FIXED WING)

Wing
A65 Old
military
aircraft
(French)

approx 1963 ? D France?

Wing failure. Lower boom, forward spar, 2014 forging. Origin: flaw at external sharp angle.

TYPE UNKNOWN (FIXED WING)

Propeller
F1 Type unknown

pre-1941 0 D USA.

Propeller blade. Origin: stress concentration where patent number was stamped into blade. 115 airframe hours.

TYPE UNKNOWN (US MEDIUM PATROL BOMBER)

Landing Gear
G2 US medium
patrol bomber
(tail-wheel)
(USAAC)

Oct 42 ? ? ?

Failure in torque scissors fitting welded to outer cylinder of main gear shock strut (Bendix). Weld between fitting & cylinder barrel.

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AIRCRAFT TYPE (FIXED-WING)

G3 US medium WW II ? ? USA?
patrol bomber Failure in drag brace strut fitting on outer
(tail-wheel) cylinder of main gear shock strut (Bendix).
(USAAC)

TYPE UNKNOWN (FIXED WING, US NAVY ATTACK AIRCRAFT)

A29 Wing Attack-type approx ? ? USA?
airplane 1950 Wing failure. Role: dive bombing & rocket
(US Navy) launching.

A30 Attack-type approx ? ? USA?
airplane 1950 Wing failure. Role: dive bombing & rocket
(US Navy) launching.

TYPE UNKNOWN (FIXED WING, US NAVY FIGHTER)

A31 Wing Piston-engine approx ? ? USA?
fighter 1950-52 Wing failure. Role: training in ground support
(US Navy) tactics, rocket launching runs.

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SUMMARY/SOMMAIRE 15 A world-wide survey was done of serious aircraft accidents involving fatigue fracture. Volume 1 of the report deals with fixed-wing aircraft, while Volume 2 addresses rotary-wing aircraft. A total of 1466 fixed-wing accidents since 1927 were identified as having fatigue fracture as a related cause, and these accidents resulted in 1861 fatalities. The accidents cover civil and, to a limited extent, military aircraft. Accidents are listed by failure type, as well as by aircraft type. Engine/transmission failure and landing-gear failure were the most common cause of recent fixed-wing accidents, and currently there is an average of about 69 fixed-wing fatigue accidents per year.				

END

FILMED

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